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8 June 1983

Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

No. 191

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CONTENTS

150,000 PARTICIPATE IN ANTINUCLEAR RALLIES IN MAJOR CITIES

Roundup of Reports

Sydney THE SYDNEY MORNING HERALD in English 28 Mar 83 p 3

[Article by Liz Doyle]

[Text] **Almost 150,000 people marched yesterday in rallies around Australia calling for nuclear disarmament.**

The biggest crowd was in Melbourne, where police and organisers estimated 60,000 marched. In Sydney the crowd was estimated at 50,000.

They were the biggest rally crowds since the anti-Vietnam War protests of the 60s.

Crowds in other cities were estimated at: Brisbane 5,000, Perth 15,000, Canberra 2,000, Adelaide 10,000, Hobart 1,000.

Sydney

More than 50,000 people marched in the largest rally Sydney has seen since the 60s and at times it looked and sounded like a peace rally of that era.

The march was led by the Federal Minister for Territories and Local Government, Mr Uren, and the author Patrick White.

They were flanked by the Deputy Premier, Mr Ferguson, the Minister for Corrective Services, Mr Jackson and Roman Catholic Bishop John Heaps.

Behind them was a considerable delegation of Christians, who sang 60s songs such as Where Have All The Flowers Gone and Blowin' in the Wind.

Among the Church leaders were Bishop Bedes Heather of the Roman Catholic Church at Blacktown, the Rev Dorothy MacMahon of the Uniting Church and Bishop John Reid of the Anglican Diocese of Sydney.

Following them were groups of doctors, scientists, nurses and lawyers, trade union groups such as the Building Workers' Industrial Union and the Teachers' Federation, Aboriginal and local peace groups, the Unemployed Workers' Union, ethnic and environmental representatives and political and student groups.

The march was covered by television crews from East Germany and America. The American NBC reporter said the march's significance for Americans lay in its call for the expulsion of US bases from Australia.

The march culminated in a 'disarmament festival in the Domain, where the crowd was addressed by the playwright David Williamson.

He said that with the introduction of laser weapons, "the world has been reduced to a giant Space Invaders game" with President Reagan and the Soviet Leader, Mr Andropov, at the controls.

The only species to survive a nuclear holocaust would be the cockroach, he said.

Melbourne

The marchers urged the Federal Government to ban uranium mining, remove nuclear-related military bases from Australian soil, and deny access to nuclear-armed planes and ships.

Police estimated the peaceful crowd at 50,000. Rally organisers announced that more than 70,000 had attended.

The Premier, Mr Cain, some State and Federal Labor Ministers and the ACTU president, Mr Dolan, strode out alongside the Anglican Archbishop of Melbourne, the Most Rev Robert Dann, and Melbourne's Lord Mayor, Councillor Bill Gardner.

Behind the sombre-suited political leaders and clergy, the rally was a forest of slogans and sound. A skeleton carrying a balloon walked along with his mum. Latin Americans, Lebanese and a kilted Scot mingled with international socialists, priests and nuns.

One protester hid his face behind a felt fedora which said "Bewdy Nuke."

Canberra

The increased number of Labor women in Parliament could help ensure the Government strengthened its emphasis on the international peace movement, the Federal Minister for Education, Senator Ryan, told the Canberra rally.

She said the rally was the most important public meeting she had addressed since becoming a minister.

"If we don't win the issue of peace, the winning of elections will mean nothing," Senator Ryan said.

Brisbane

Special Branch detectives were mentally and politically harassing Queenslanders, the Opposition Leader, Mr Wright, told anti-nuclear demonstrators in Brisbane.

Mr Wright led a legal march by about 5,000 people through inner-city streets, despite being warned his image could be ruined by being seen with "the fringe elements of politics."

The march, watched by a large contingent of police, stretched up

to 1.5km through the streets as politicians and punk rockers, students and socialists, Christians and conservationists, Aborigines and whites, joined in one of the city's largest demonstrations in recent years.

Brisbane's first anti-nuclear rally three years ago attracted 80 people. Yesterday's turnout reflected the growing concern about nuclear energy and armaments, one of the organisers, Senator George Georges, said.

Adelaide

Anti-nuclear campaigners were joined by politicians, religious leaders and supporters of the world peace movement in the 1km march down King William Street to Elder Park.

Frances Magill, one of the organisers of the march, said the movement wanted production and stockpiling of nuclear weapons outlawed, an end to the arms race and the removal of all foreign military bases from Australia.

"We are trying to influence Governments to divert money from the arms race toward eliminating poverty, ill-health, unemployment and human suffering," she said.

Disparate Sydney Protesters

Sydney THE SYDNEY MORNING HERALD in English 29 Mar 83 p 2

[Article by Richard Macey]

[Text] The 50,000 people who marched through Sydney on Sunday in support of nuclear disarmament represented what must have been one of the most extraordinary coalitions the City has seen.

Church groups and gay groups, the employed and unemployed, and Government Ministers joined the march — one of many held in major cities around Australia.

The Sydney march was organised by the Sydney Nuclear Disarmament Co-ordinating Committee, an umbrella group made up of about 60 member organisations.

The members include such groups as the Uniting Church Board for Social Responsibility, the Australian Bank Employees Association, the Building Workers' Industrial Union, the Teachers' Federation, Actors Equity and the Federal Plumbers and Gasfitters.

Other member organisations represent printers, seamen, NSW firemen and academics but political parties, officially, at least, are not represented.

The member groups send 85 delegates to the committee, which has Senator Bruce Childs (Labor, NSW) for its convenor and an actress, Miss Tessa Mallos, as its secretary. They are the committee's only paid workers.

Last November, the committee began planning the march in earnest. It hired an office in Pilgrim House in Pitt Street, and set about spending $10,000 to organise the demonstration.

The money came from the public and the $50 membership fees paid by the larger organisations represented on the committee. The smaller bodies, with fewer than a 1,000 members, paid $25.

"I had to work 16 hours a day for three months organising the march," Miss Mallos said yesterday.

The work paid off on Sunday when the demonstration, said to be one of the biggest since the marches against the Vietnam War, snaked its way through Sydney's streets.

In the front ranks were the Federal Minister for Territories, Mr Uren, the Minister for Veteran Affairs, Senator Gietzelt, and the Deputy NSW Premier, Mr Ferguson.

The Democrats were represented by Mrs Elizabeth Kirkby, MLC. The author Patrick White and the playwright David Williamson were also there.

Other marchers included Bishop John Heaps and Bishop Bede Heather of the Catholic Church, the Rev Dorothy MacMahon of the Uniting Church and Bishop John Reid of the Anglican Diocese of Sydney.

"All sorts of other groups made it along. I even saw Yanks for Disarmament, Pub Drinkers for Peace, Dykes for Disarmament and Poofs for Peace," said Miss Mallos.

Miss Mallos said a collection taken up among the marchers netted $15,700. This will leave the movement money to embark on the coming year's program, which will include a campaign to take its message to suburbs and country towns, she said.

Senator Childs said the committee would expand its education program.

"We have started running courses called Nuclear Disarmament for Beginners," she said.

"A lot of people are intimidated by the jargon of the nuclear age and these courses are a series of lectures by experts to explain the issues."

Dr John Hill, official spokesman for the Catholic Church in Sydney, stressed that the bishops who had marched had done so as individuals.

He said, however, the debate over nuclear disarmament within the Catholic Church in Australia was certain to grow, with people supporting both sides.

The Rev Gordon Trickett, general secretary of the Uniting Church's Board for Social Responsibility, which is represented on the co-ordinating committee, said he believed the level of Church participation simply reflected public attitudes.

"It's not a matter of being aligned with the Left. We are concerned about the continuation of life on this globe — the world was given to man to inherit, not destroy," he said.

Special Branch Actions

Brisbane THE COURIER-MAIL in English 29 Mar 83 p 3

[Text] THE State Opposition Leader, Mr Wright, yesterday asked the Police Commissioner, Mr Lewis, to explain the basis on which Special Branch officers photographed participants in Sunday's nuclear disarmament rally in Brisbane.

Mr Wright, who marched in the rally, said he was concerned that people who took part now had their photographs and other information recorded on Special Branch files.

Mr Wright said that in a letter to Mr Lewis yesterday he had asked what criteria was used to determine whether the Special Branch should attend a rally.

He also wanted to know who made such decisions, who directed that photographs be taken and what process was involved concerning the filing and naming of the photographs.

He also wanted to know for how long and why such photographs were kept.

CSO: 5100/7527

CONFUSION, CONTRADICTION SEEN IN LABOR'S URANIUM POLICY

Party Split Over Mining

Canberra THE AUSTRALIAN in English 28 Mar 83 p 12

[Article by Don Kirkwood]

[Text] IT was apparent from before the Federal election that the new Federal Government would have great trouble in coming to terms with the uranium mining industry.

It is a party split on the issue of whether uranium ought or ought not be mined and exported and — as a result — its policy is a most unhappy mishmash, like all compromises.

Thus we have two mines in full swing, Nabarlek and Ranger, which will be allowed to fulfil their contracts. In Ranger's case, these do not run out until 1996.

We have two further projects, at Jabiluka in the Northern Territory, not far from the two operating mines, and at Yeelirrie in Western Australia, that received permission from the previous Government to go ahead.

Then there is Roxby Downs, the giant copper-uranium deposit in South Australia, which belongs in a category all of its own. Roxby Downs can go ahead because uranium will be produced as a by-product.

Some by-product! When the mine is in full swing, it will produce 4000 tonnes of uranium oxide a year, which, at the Australian Government's floor price of $35 a pound, would place a value of $308 million on annual production. It would also be one of the largest uranium mines in the world.

The Ranger mine, producing 3000 tonnes of uranium oxide a year, is the second largest in the world. The largest now is Rossing in Namibia, with an annual output of more than 4000 tonnes a year, but Rossing is scaling its operations down.

A new mine in Canada at Key Lake will come on stream soon and build up to an annual capacity of around 4000 tonnes, making it the largest in the world.

Then there are a number of other deposits like Koongarra in the Northern Territory and Honeymoon and Beverley in South Australia that, while small, add to the basis of what could be a very significant industry indeed.

The Federal Government obviously wants the industry to go away: that is the only way one can interpret some rather fatuous comments on its future from both the Prime Minister, Mr Hawke, and the Minister for Resources and Energy, Senator Walsh.

Both have been reported as saying that the ALP's uranium policy was irrelevant to the future of the industry at present because it could not be marketed at the floor price.

They have pointed to the present world spot price (which is $21.75 a pound and not $20, as Senator Walsh has been reported as saying) as the reason the industry will find it impossible to obtain contracts at the $35 a pound level.

More than in any other industry, the spot price is irrelevant to the development of uranium mines.

World uranium trade conducted on a spot basis is infinitesimal and it is based on inventory trading between utilities.

Virtually no uranium straight from the mine is sold on a spot basis.

And, given the very stringent controls the new Federal Government has inherited from its precedessor, it is inconceivable that any Australian

uranium miner could conduct a spot sale, let alone justify the development of a new mine on such a basis.

The second point is that, so far as Yeelirrie and Jabiluka are concerned, contracts written today for the supply of uranium would not involve delivery for at least three years.

Without those contracts — and Pancontinental Mining is very close to clinching one with the UK at the $35 a pound level, and is confident that it can obtain others — the mines cannot proceed.

So what is Senator Walsh going to do when contracts that meet the guidelines are presented to him? It is nonsense to pretend, on the basis of a market that Australia's uranium miners are never likely to be involved in, that the question is not relevant.

The Roxby Downs exemption, in any case, exposes the moral hollowness of current Federal Government policy.

This is not the end of the matter. At Nabarlek, there are 2500 tonnes of uranium oxide which has been mined and that is not covered by sales contracts.

Will it simply sit on the ground? At the rate of Nabarlek's deliveries (about 1000 tonnes a year) this represents two-and-a-half year's work for the mine's small labor force and, more importantly, about $77 million a year in export income.

But the real test will come from ERA, and the indications are that it will come rather more suddenly than Senator Walsh would like.

ERA has been operating the world's second largest uranium mine since late 1981.

It has established an international reputation for reliability of supply and, having organised contracts for almost all of its output for many years ahead, it has an unrivalled feeling for the international market, at least in Australia.

It has been suggested that there will be no real growth in the international uranium market until the late 1990s, but ERA disputes this view.

It believes supply and demand will come into balance around 1985, just two years away.

Contracts

The company is encouraged by recent developments in the world market. After all, while the spot price is only $21.75, it has moved up 28 per cent from its low of $17 which it hit last September and it is still rising.

That spot price, ERA believes, has not yet settled — it can rise considerably further.

But more to the point, ERA is confident it can write new contracts, with delivery scheduled to begin in the mid-1980s, within the federal guidelines — floor price included.

Over the past 18 months, 40 per cent of the US uranium mining industry's capacity has been closed down, and most of it will not be reopened.

ERA sees its opportunities in the US and in Europe, and says it has received positive responses from these markets in recent months.

ERA's ambition is to double its capacity to 6000 tonnes of uranium oxide a year, which it can do at minimal cost and which would make it the largest mine in the world.

By the end of the decade, Roxby Downs, Ranger, Jabiluka and Yeelirrie could be selling up to 16,000 tonnes of uranium oxide a year.

That's income of $1200 million a year, based once again on the floor price and assuming the market is there.

It also ignores the development of any other discoveries and of discoveries yet to be made: and it does not take into account the prospect — a very real one, given its immense reserves — that Jabiluka could be producing at the same rate as Ranger, and not at 3000 tonnes a year.

The awkward fact is that Australia is abundantly endowed with uranium, perhaps with one-third of the western world's known viable resource.

And it is more than likely that the surface has been only scratched — much more is to be discovered.

Our customers and potential customers are precisely those nations with which we enjoy the closest trade and diplomatic ties.

To deny them access to this resource — at the right price, of course, which as the Prime Minister and Senator Walsh have noted, is not the spot price — will confuse those ties and inject doubts that need not arise.

Our refusal to develop and sell uranium, if that is really to be the Federal Government's policy, will not diminish our trading partner's need for the material.

They will obtain it from elsewhere; maybe at a slightly higher price, but obtain it they will.

Meanwhile, Australia's reputation as an international supplier of good repute and reliability of any commodity will have been tarnished, and jobs and revenues vital to our balance of payments will have been forgone, possibly forever.

The present Federal Government's policies and attitudes are quixotic. It's time the ALP stopped tilting at windmills.

SA Miners' Disappointment

Canberra THE AUSTRALIAN in English 29 Mar 83 p 7

[Text] THE South Australian Chamber of Mines has labelled the State Government's ban on the Honeymoon uranium mine a "disgraceful decision".

The president, Mr Bernie Leverington, said the Government's move would have disastrous consequences for further mining development in South Australia.

"It's so illogical," said Mr Leverington. "Here we are with a political party which somehow thinks it is going to save the world when uranium is being mined in the Northern Territory. All we are doing is exporting jobs to South Africa and Canada.

"I am concerned the future of South Australia can be put at risk by an ideological decision of politicians whose position, by and large, is secure."

Mr Leverington said his views were shared by a wide cross-section of the business community and the public.

He said the State would lose a bright future in mineral exploration and development and a unique exploration advantage in a hunt for other minerals.

The decision would also cost thousands of jobs as demonstrated by the 25,000 mining positions created in Western Australia over 25 years and cost South Australia a fortune in mineral exploration investment because companies could no longer afford the risks of not being allowed to mine what they found.

"And the election of the Hawke Federal Government has extinguished all hope of a uranium enrichment plant and a conversion plant in South Australia and the thousands of jobs they would have created."

NT's Bid for Clarification

Canberra THE AUSTRALIAN in English 5 Apr 83 p 3

[Article by Errol Simper]

[Text] THE Chief Minister for the Northern Territory, Mr Everingham, will today ask the Federal Government to clarify its attitude to uranium mining in the wake of the South Australian Government's rejection of that State's Honeymoon mine.

Mr Everingham will raise the matter at meetings in Canberra today with the Prime Minister, Mr Hawke, and the Minister for Resources and Energy, Senator Walsh.

The Honeymoon decision, which was backed by Senator Walsh, has thrown a shadow over the future of the Koongarra and Jabiluka uranium prospects in the Northern Territory, held respectively by Denison Australia and Pancontinental.

"We assume the South Australian decision was made on the peculiarities of that particular operation (a controversial in-situ leaching process)," Mr Everingham said in Sydney yesterday.

"What the new Government seems to have been saying so far is that their criteria for approval of uranium projects is the availability of markets and a reasonable price.

"Both Denison and Pancontinental say they have markets available and that they can sell at the floor price approved by the previous government. My understanding is that this is a price which is acceptable to Senator Walsh."

Mr Everingham said he was keen to discuss the uranium issue with the deputy Prime Minister and Minister for Trade, Mr Bowen, and would probably do so at the national economic summit which begins next week.

He also expects to talk today with the Defence Minister, Mr Scholes, and the Minister for Foreign Affairs, Mr Hayden, and said the Government's attitude to Indonesia, the Darwin-Alice Springs rail line and the economic summit would be raised at the talks.

Mr Everingham, who has taken a close interest in Indonesia and who is friendly with President Suharto, said it was imperative Australia did not let the East Timor annexation sour the two countries' relations.

Important

"One of the things that concerns me a lot is that the Government maintains a friendly policy towards Indonesia," he said.

On the forthcoming economic summit, Mr Everingham said: "I'll be trying to get some inkling from the Prime Minister of how he sees the summit operating, because it's going to be pretty difficult, as I see it, getting consensus out of such a large body of people.

"There'll be a hell of a lot of vested interests to expect to easily weld them into one opinion."

Mr Everingham said he had been heartened at the weekend by a statement by the Minister for Transport, Mr Morris, that work on the $545-million Darwin-Alice Springs rail link could begin this year.

"It is important for Australia at this stage that the final link in the national railway network be completed," he said.

"It will be good for economic recovery and will help the Northern Territory play a much more meaningful part in the national economy.

"It's also important for Australia's defence infrastructure, especially now that we're committed to what is effectively a land-based defence – a fortress Australia concept – with no more aircraft carriers."

The Territory, highly dependent on Federal Government funds, has retained a former national ALP secretary, Mr David Combe, as a consultant in its negotiations with Canberra.

CSO: 5100/7527

BRIEFS

NUCLEAR WASTE PROBLEM--The State Government has not decided where to transfer radioactive waste now stored in buildings in Parliament Place. A Government spokeswoman said yesterday Cabinet had decided to continue with plans to build a dump on Department of Agriculture land at Westmeadows but had not decided whether the waste would be transferred there. The waste has been described by the Health Commission as "low level" and was mainly left over from cancer treatment. The Government would examine any alternatives to the Westmeadows site and wanted to hear the public's views. The storeroom containing the waste was close to a fire in the Parliamentary offices in late February. The Victorian Public Service Association wants the waste removed. The Premier, Mr Cain had received delegations from local councillors and parliamentarians on the proposal and was recently given a petition signed by 3000 residents near the proposed site asking that the waste be stored elsewhere. [Text] [Melbourne THE AGE in English 24 Mar 83 p 15]

KOONGARRA URANIUM ROADBLOCK--Darwin.--The Federal Minister for Aboriginal Affairs, Mr Holding, has tried to stop negotiations on a multi-million dollar deal between tribal Aborigines and a uranium mining company. A letter from Mr Holding this week to the Darwin-based Northern Lands Council and the primary traditional owner, Mr George Hunt, requested that negotiations on the proposed $150 million Koongarra uranium project be shelved. However, the NLC and the Koongarra leaseholder, Denison Australia Ltd. have continued negotiations on a mining agreement for the project. The move by Mr Holding to persuade the NLC to drop the negotiations follows unsuccessful attempts by a minority of traditional owners, officers of the Australian National Parks and Wildlife Service and conservation groups to block the project. The letter was received by the NLC on Tuesday as the latest round of negotiations between the company and the land council began in Sydney. Mining industry and land council sources said yesterday that Mr Holding had said it would be undesirable for negotiations to continue. They said the director of the NLC bureau, Mr Wesley Lhanupuy, called land council negotiators in Sydney on Tuesday and advised them of the minister's request. [Text] [Sydney THE SYDNEY MORNING HERALD in English 1 Apr 83 p 4]

BAN ON LEACH MINING--Adelaide.--The South Australian Mines and Energy Minister, Mr Ron Payne, yesterday banned continued development of the leach mining method at Honeymoon in the State's north-east. Mr Payne was speaking

before a meeting with the Honeymoon joint venture companies. He held the meeting to explain why the Government would not grant a mining licence for the deposit. The companies had asked to meet Mr Payne, apparently to canvass the terms of any retention lease on the site, 75 km north-west of Broken Hill. The minister made it clear yesterday however, that pilot plant tests of leaching were not a possibility. Asked if continuing development of leach technology at Honeymoon under a retention lease was a possibility he replied: "Not at this stage." The companies involved are MIM Holdings, AAR Limited, a wholly-owned subsidiary of CSR, and Teton Australia, a subsidiary of the US-based United Nuclear Corporation. Earlier Mr Payne had met a delegation from the Campaign Against Nuclear Energy. He was shown confidential documents about technical problems at Honeymoon and information about similar schemes in the United States. [Text] [Sydney THE SYDNEY MORNING HERALD in English 25 Mar 83 p 11]

CSO: 5100/7528

NUCLEAR ENERGY DEVELOPMENT IN JAPAN DISCUSSED

Rome NOTIZIARIO DELL'ENEA in English Supplement ENERGIA NUCLEARE Feb 83 pp 48-54

[Article by Takashi Mukaibo, Acting Chairman Atomic Energy Commission Japan: "Nuclear Energy Development in Japan"]

[Text] **The newly established long-term nuclear power programme provides for fostering the development of national economy and enhancement of living standards through nuclear energy**

OUTLINE OF NUCLEAR ENERGY DEVELOPMENT IN JAPAN

Nuclear energy has marked a quarter century of development and utilization in Japan, counting from the enactment in 1956 of the Atomic Energy Basic Law and the concomitant establishment of the Atomic Energy Commission.

The unhappy circumstance of our first encounter with nuclear power in the form of the atomic bomb has rooted in the minds of the Japanese people a firm resolution to abstain from military nuclear applications. The fundamental principle of limiting our efforts in this field strictly to peaceful uses is clearly stipulated in our Basic Law and has become our consistent underlying policy in respect of nuclear energy development and utilization.

THE FIRST PERIOD

Looking back on the history of nuclear energy development and utilization in Japan, the first ten years can be considered to have been spent in establishing the foundations for our development and utilization of nuclear energy. Thus, after the enactment of the Basic Law, there was seen the establishment of the Atomic Energy Commission, which was entrusted with planning, examining and deciding the policy to be followed in the development and utilization of nuclear energy. This was followed by the setting up of various national centres of nuclear research and development, including the Japan Atomic Energy Research Institute, the Nuclear Fuel Corporation –which later became the Power Reactor and Nuclear Fuel Development Corporation – and the National Institute of Radiological Sciences.

Such was the national organization set up for enhancing the level of research and development in this domain, and the tools made available for pursuing these activities included the research reactor JRR-1 which attained criticality in 1957, followed in 1962 by the JRR-3 which was the first reactor designed and constructed in Japanese hands.

In respect of nuclear power generation, the first kilowatt hour of nuclear power was produced in Japan in 1963, with the JPDR – the Japan Power Demonstration Reactor, a

12.5 MWe light water reactor – installed in the Japan Atomic Energy Research Institute. Two years earlier saw the start of construction on a Calder Hall type commercial nuclear power station imported from Great Britain.

With the view of overcoming the handicap of our entry into the scene of nuclear research and development far behind other advanced countries, and in consideration of the limitations besetting us in respect of the natural resources indispensable for utilizing nuclear power, we proceeded to conclude with the United States an agreement for cooperation in nuclear research, followed by bilateral agreements for the supply of enriched uranium, nuclear material and equipment contracted with the United States, Great Britain and Canada. In the IAEA, Japan gained membership from its very establishment, and later became the first country to adopt the process of obtaining uranium from the Agency. Japan also actively participated in advancing the purpose of IAEA by positively accepting the nuclear safeguard measures laid down by the Agency.

THE SECOND PERIOD

The decade extending from the second half of the 1960's to the first half of the 1970's served us to assimilate the acquired technology, to provide for establishing the nuclear fuel cycle and to draw up the basic lines along which to develop our own concept of a New Type Power Reactor. For nuclear power generation, we actively pursued the line of obtaining access to the technology of light water reactors, which were considered already proven. In actual implementation, however, mastery of the acquired technology was not accomplished overnight, and called for innumerable repetitions of trial and error to reduce the frequency of unforeseen outages and raise the level of plant utilization factor. A considerable independent national effort – in terms of man power and expenditure – was also directed to studies for verifying the operational safety aspects.

The Power Reactor and Nuclear Fuel Development Corporation – established in 1967 – undertook the development of the Advanced Thermal Reactor and the Fast Breeder Reactor – for their advantage of high neutron utilization. Other efforts have been directed by the same Corporation to research and development work required for closing the fuel cycle, including such works as uranium enrichment and on spent fuel reprocessing.

The progress of nuclear power development and utilization marking the latter part of this second decade of Japanese nuclear development was characterized by a rising public concern over the safety of nuclear installations. Much public controversy was also raised in connection with the poor records of plant load factor of nuclear power stations due to frequent and extended outages for mechanical troubles as well as for inspection and maintenance operations.

THE THIRD PERIOD

The third decade of the Japanese nuclear age – which brings us to the present time – is seeing intensified efforts in developing nuclear power generation, while active endeavours are also being made toward commercialization of domestically developed technologies related to our New Type Power Reactor and the nuclear fuel cycle. This present decade is also being characterized by an increasing international interest focussed on the question of nuclear non-proliferation.

The Experimental Fast Reactor Joyo of 100 MWt went critical in 1977, followed in the ensuing year 1978 by the Prototype Advanced Thermal Reactor Fugen of 165 MWe, and both reactors have since

Fig. 1. LOCATION OF NUCLEAR FACILITIES IN JAPAN

(As June 1982)

Commercial Plants		Units	MW
□	In Operation	24	17,177
△	Under Construction	11	10,704
( )	Being Built	6	5,003
	Total	41	32,884
■	R & D Power Plants		
	FUGEN in Operation		165 MW
	MONJU in Preparation		280 MW
●	Fuel Cycle Facilities		

been operating without any significant troubles.

In relation to the fuel cycle, a spent fuel reprocessing plant of 0.7 ton per day capacity and an uranium enrichment pilot plant entered operation in 1977 and 1979, respectively, to mark a step forward in our advance toward practical establishment of the fuel cycle.

Our other activities in nuclear development include such subjects as the High Temperature Gas Reactor – envisaged for uses other than power generation – and nuclear ship propulsion. We are also actively extending our studies into the domain of nuclear fusion, which is expected to provide the answer to the future energy requirements of mankind, with our aim of seeing its practical utilization in the 21st century.

During this same period, a start was also made in revising the national setup for nuclear administration: in 1978, the regulatory function was separated from the Atomic Energy Commission, to be entrusted to the newly established Nuclear Safety Commission. One objective of this change was to establish a unified and consistent system for regulatory administration of nuclear safety, of which functions were so far diversed in different parts of the government. Another aim of this reorganization was to strengthen the regulatory function of nuclear administration so as

to secure the confidence of the national public in nuclear power, and to permit reactivation of the efforts of development and utilization in this field.

The period further coincided with a world-wide move calling for reinforcement of the system to limit nuclear arms proliferation, and occasioned a political issue between Japan and the United States concerning the operation of the Spent Fuel Reprocessing Plant installed as the Tokai Establishment of the Power Reactor and Nuclear Fuel Development Corporation. A notable step forward was marked in this connection with the memorable conclusion that «non-proliferation is compatible with the peaceful uses of atomic energy», which was derived by the International Nuclear Fuel Cycle Evaluation, in which Japan also took an active part.

FUTURE TRENDS OF NUCLEAR ENERGY DEVELOPMENT AND UTILIZATION IN JAPAN

I have so far briefly recounted th highlights in our history of nuclear power development, and in what follows, I should like to describe our policy for the future.

We all know that the twice-repeated oil crisis has decidedly enhanced the expectations attached to nuclear energy as the staple substitute energy for oil, and with particular regard to Japan – with very scarce national energy-bearing resources –the development and utilization of nuclear energy is an indispensable necessity. It is also in this context that we are striving toward the commercial application of our New Type Power Reactor and endeavouring to close our nuclear fuel cycle. We are also fully aware of the question of non-proliferation and the need for international collaboration in nuclear research and development efforts.

These circumstances have led the Atomic Energy Commission to review the situation and to re-examine our future policy in the light of such a review. The study extended over a period of sixteen months, and culminated this past June in the adoption of a new Long-Term Programme, based on which the Atomic Energy Commission will promote the development and utilization of nuclear energy in Japan.

OUTLINE OF THE NEW LONG-TERM PROGRAMME

The first point set forth in our Long-Term Programme is the size to be realized in terms of the total generating capacity of nuclear power stations. In 1981 we already had 24 stations in operation, with a total installed capacity of 17 million kilowatts, which contributed about 17 percent of the aggregate supply of electrical energy. As for the future, the plan for overall energy supply established this past April by the Japanese Government gives for 1990 a target total installed nuclear generating capacity of 46 million kilowatts to contribute 30 percent of the electrical energy supply, to be realized through intensified efforts in expanding our nuclear generating capacity. For the year 2000, we envisage a figure of 90 million kilowatts to represent 30 percent of the total installed generating capacity and to contribute 40 percent of the aggregate electrical energy supply.

To attain these objectives, we are putting the first priority on further ensuring trouble-free operations of nuclear power stations to reduce uneasiness and worries of the public, and to ensure the balanced development of the community, thus promoting smooth introduction of nuclear power stations. We are also actively tackling the problem of radioactive waste management and measures for safe decommissioning of retired nuclear reactors.

Another target in our Programme is the standardization of light water reactor design, with the view of enhancing their reliability and economy; effective contribution to this

Fig. 2: Primary Energy Supply in Japan

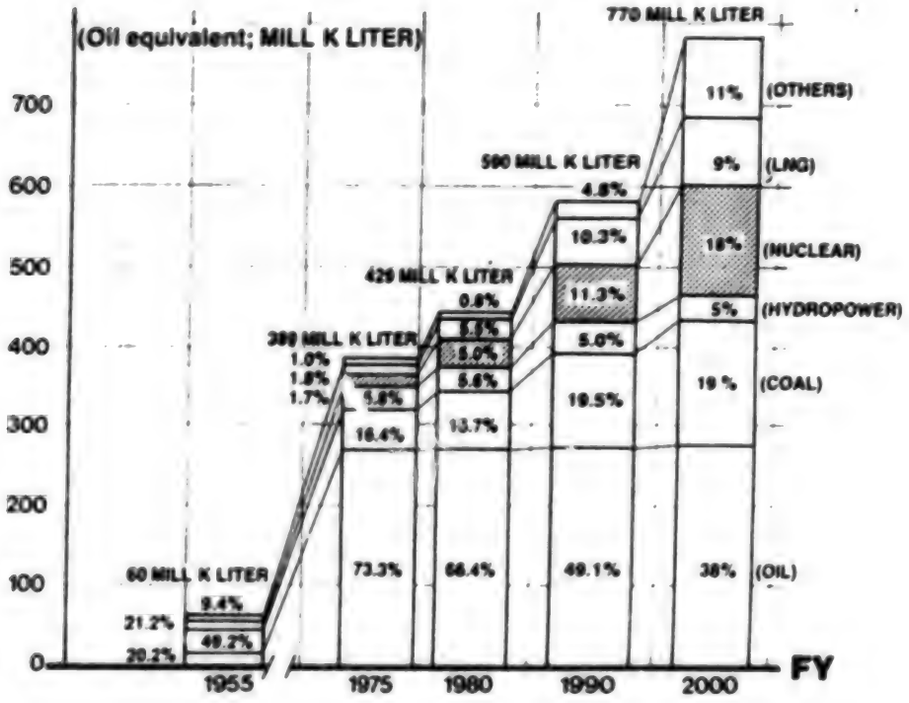
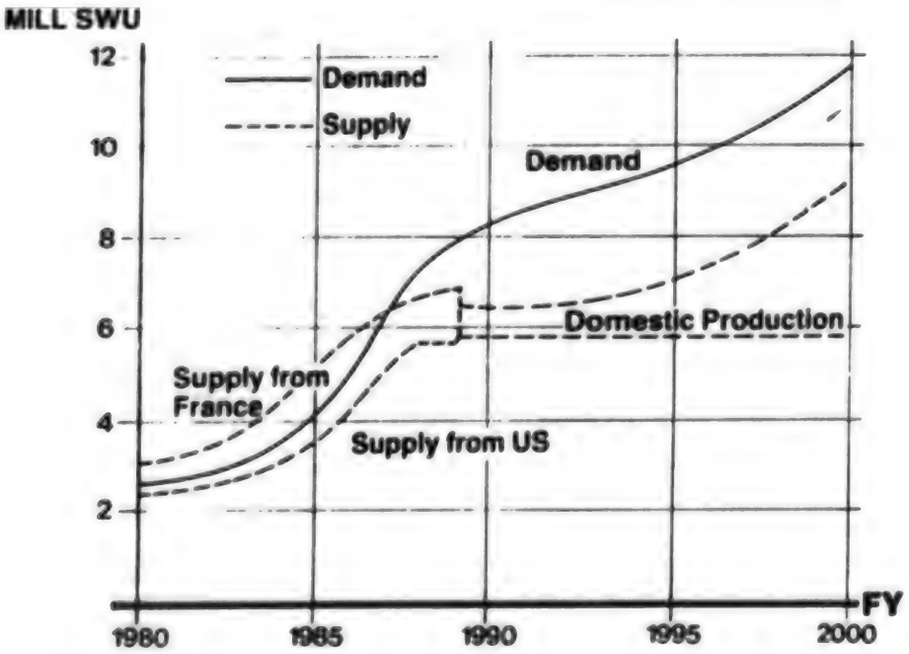


Fig. 3: Forecast of Balance on Uranium Enrichment



objective is expected from our projects on the Advanced Boiling Water Reactor and the Advanced Pressurized Water Reactor, undertaken jointly between Japanese utility companies and US manufacturers.

The second point emphasized in our Long-Term Programme is the establishment of the closed nuclear fuel cycle in our own hands, which is a question that also involves our choice of reactor concept. For the time being, we will rely mainly on light water reactors for power generation, and seek to ensure a stable supply of the nuclear fuel required to keep these reactors operating.

Our accumulative requirement of natural uranium is expected to amount to 130 thousand short tons in 1990, to rise in the year 2000 to 310 thousand short tons. To meet this need, we have assured ourselves of a supply of 200 thousand short tons through long-term contracts with various overseas sources. For the future, we will seek to secure stable supply of uranium ore through prospecting and exploitation of mines undertaken in our own hands in concessions acquired abroad.

Our uranium enrichment requirements should reach 8 million swu in 1990, to rise in the year 2000 to 12 million swu. We depend at present on overseas enrichment services, but we are intending to establish our own means of enrichment, through centrifuge technique, as far as practicable.

In line with this plan, the pilot centrifuge plant that entered service this year will be followed by the construction of a 200 thousand swu per year demonstration plant; our target is set at the commissioning of a commercial centrifuge enrichment plant before the end of 1980's, and to avail ourselves of an annual separative capacity amounting to 3 million swu by the year 2000.

Considering the plutonium and unburned uranium contained in spent fuel to be a virtually indigenous source of energy, we plan to take measures for their active utilization. To this end, we will reprocess the spent fuel discharged from our power stations, and have this done in so far as practicable within our own facilities. For this purpose, our existing Tokai Reprocessing Plant is planned to be followed by a second plant of 1,200 tons per year capacity, expected to enter into service around 1990.

In future, plutonium will be burned in fast breeder reactors, whose development will be pursued with the target of achieving their successful commercial application around the year 2010. With this aim, construction will soon start on our prototype fast reactor Monju planned to reach criticality around 1990. We also expect to set about constructing a demonstration fast reactor in the early 1990's.

While awaiting the commercial application of the fast breeder reactor, and even thereafter, until these reactors become available in large scale, a considerable amount of plutonium is expected to accumulate, and we shall be burning this plutonium in reactors of our advanced thermal concept, as well as in light water reactors. The Advanced Thermal Reactor is a heavy water reactor of which concept was originated in Japan and which can burn effectively and simply both plutonium and recovered uranium. The experience gained with the 165 MWe prototype reactor Fugen – already in full operation for 3 years successfully – will serve us in our plans for advancing into the next step of constructing a 600 MWe demonstration reactor which we plan to bring to criticality in the early 1990's. This development will be paralleled by attempts of burning plutonium in light water reactors, to culminate in successful demonstration of plutonium recycle in light water reactors toward the mid-1990's.

The third point in our Long-Term Programme is the recognition that, among the various projects undertaken by the Power Reactor and Nuclear Fuel Development Corporation – which is a governmental agen-

Fig. 4: Forecast of Balance on Spent Fuel Reprocessing

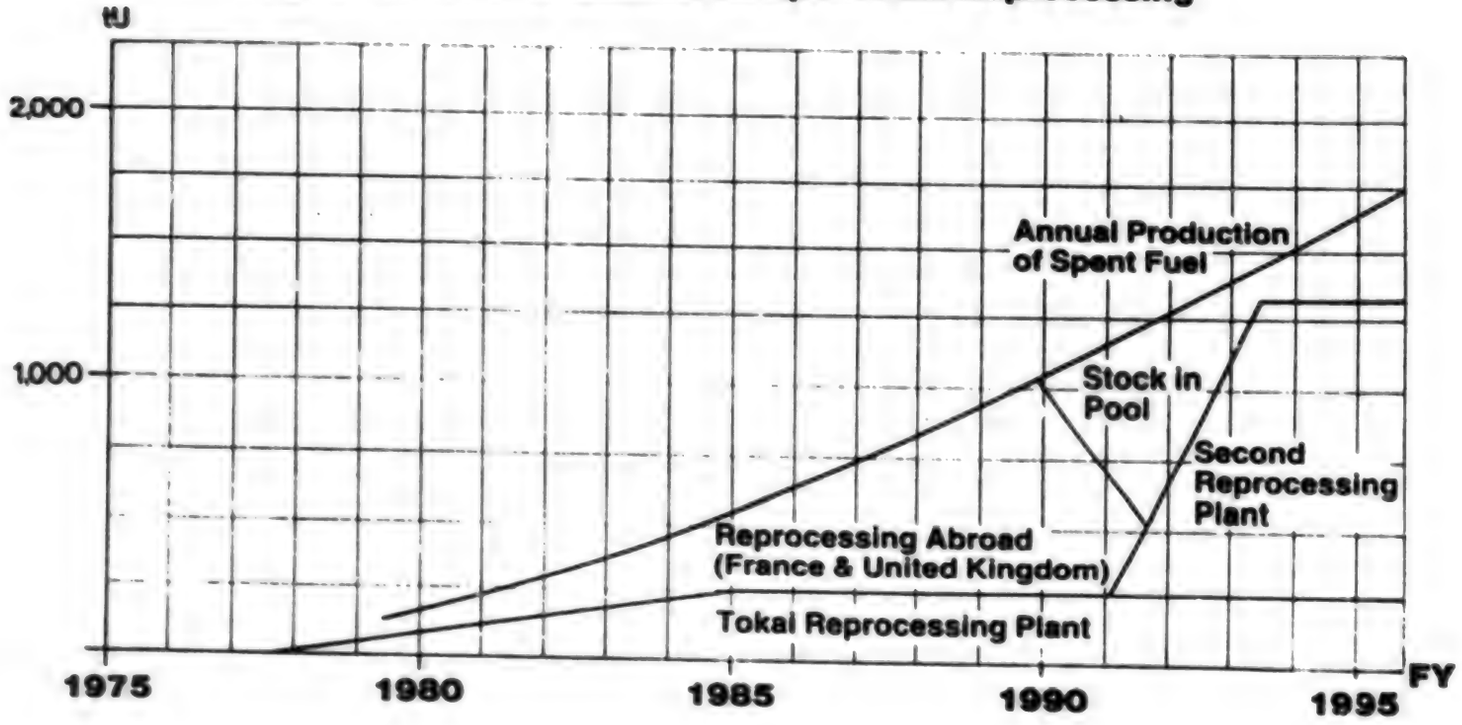


TABLE I

OUTLOOK OF LONG - TERM PRIMARY ENERGY SUPPLY AND DEMAND IN JAPAN

ITEM	FISCAL YEAR 1980		FISCAL YEAR 1990		FISCAL YEAR 2000	
PRIMARY ENERGY DEMAND	429.0 mill. kl		590 mill. kl		770 mill. kl	
RATE OF ENERGY SAVING	-		15.5%		25%	
TYPE OF ENERGY	Quantity	Rate (%)	Quantity	Rate (%)	Quantity	Rate (%)
COAL	92.4 mill. tons	16.7	153 mill. tons	19.5	200 mill. tons	19
NUCLEAR	15.7 mill. kW	5.0	46 mill. kW	11.3	90 mill. kW	18
NATURAL GAS	25.9 mill. kl	6.0	68 mill. kW	11.5	82 mill. kl	11
WATER POWER - ORDINARY HYDRO-POWER	19.0 mill kW	5.6	235 mill. kW	5.0	30 mill. kW	5
- PUMPING-UP HYDRO-POWER	10.8 mill. kW		22 mill. kW		33 mill. kW	
GEOTHERMAL POWER	0.3 mill. kl	0.1	6 mill. kl	1.0	15 mill. kl	2
NEW ENERGY	0.7 mill. kl	0.2	15 mill. kl	2.5	65 mill. kl	8
OIL	285.0 mill. kl	66.4	290 mill. kl	49.2	290 mill. kl	37
TOTAL SUPPLY	429.0 mill. kl	100.0	590 mill. kl	100.0	770 mill. kl	100

TABLE II

OUTLOOK OF INSTALLED ELECTRIC POWER IN JAPAN (MW)

ITEM	FISCAL YEAR 1980	RATE %	FISCAL YEAR 1990	RATE %	FISCAL YEAR 2000	RATE %
NUCLEAR	15,510	12.0	46,000	22.0	90,000	30
COAL	5,260	4.1	23,000	11.0	50,000	17
LNG	19,710	15.2	43,000	20.6	47,000	16
ORDINARY HYDRO POWER	17,860	13.7	22,000	10.5	28,000	9
PUMPING-UP HYDRO POWER	10,810	8.4	22,000	10.5	33,000	11
GEOTHERMAL POWER	130	0.1	2,700	1.3	7,000	2
LPG	600	0.5	3,300	1.6	45,000	15
OIL	59,480	46.0	4,700	22.5		
TOTAL	129,360	100%	166,700	100%	300,000	100%

cy – uranium enrichment, reprocessing and the Advanced Thermal Reactor have come to maturity to the stage of being transferred to private industry. Electric power generation and distribution in Japan are being undertaken by private enterprises, so that the technology developed in government institutions requires at a certain stage to be transferred to relevant nongovernmental establishments for commercial application. Smoth implementation of this transfer will depend on opportune and appropriate assistance by the Government in the transition period to permit private enterprises to take increasingly active parts in the efforts to realize practical and economically viable application.

The next fourth point in our Programme is the promotion of research and development in fields other than those covered by the preceding three points. They include studies related to the treatment and disposal of high-level waste discharged from fuel reprocessing plants, the reprocessing plants, the reprocessing of spent fuel from fast breeder reactors, and other problems remaining to be solved in furthering nuclear power generation and in establishing the nuclear fuel cycle.

In the domain of nuclear fusion, our Programme provides with the achievement of self-ignition before the end of the present century, following the realization of energy breakeven plasma condition with our JT-60 Tokamak device – now under construction –.

The high-temperature gas-cooled reactor – intended for multiple uses –is taken up for its promise of extending nuclear applications to new fields. Our immediate objective is the construction of an experimental reactor of about 50 MWt, planned to enter into service around 1990, which will embody the results of research and development gained in the past. The envisaged reactor outlet temperature – originally set at 1.000° centigrade – has been modified to the more realistic value of 950° centigrade.

In the field of nuclear ship propulsion, we will proceed on our plans for experimental voyages to be undertaken by our first nuclear ship Mutsu. We will in parallel pursue the development of an advanced marine reactor of more compact and efficient design.

In the field of radiological applications, our studies will be directed in particular to the practical utilization of accelerators in medical diagnosis and treatment.

Point 5 in our Programme is the nuclear non-proliferation. Our unvarying policy – expressly stated in our Basic Law governing atomic energy – is to limit our application of nuclear energy strictly to peaceful uses, and to contribute our unreserved support to the maintenance and reinforcement of the Nuclear Non-proliferation Treaty. In line with this policy, we took it upon ourselves to accept the Iaea Safeguards Measures. All these actions on our part have manifested to the world our garantee of our peaceful utilization of nuclear energy. We will continue to undertake appropriate improvements of the national safeguards so as to satisfy the effective and efficient application of the Iaea safeguards under the Npt regime.

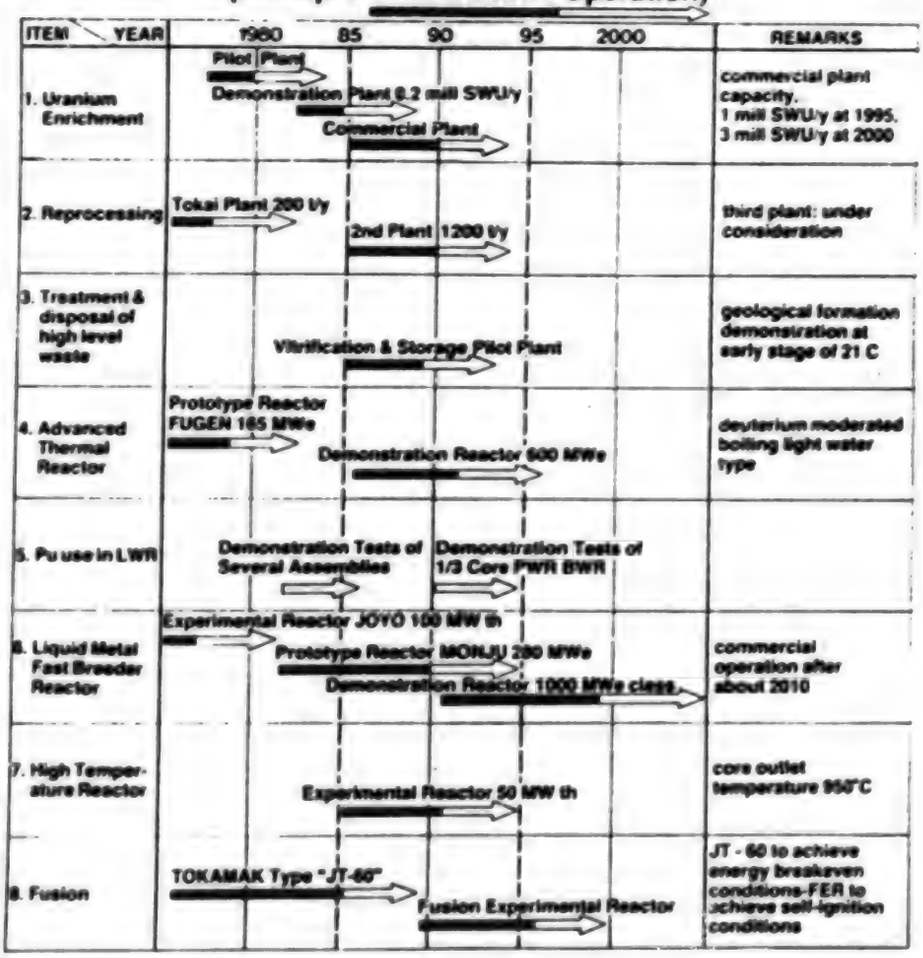
Taking due note of the conclusions reached by the International Nuclear Fuel Cycle Evaluation, we intend to participate more positively in the question of non-proliferation. To this end, we will continue to cooperate with the Agency in improving the international safeguards through our support programmes to the Agency.

We also intend to contribute actively toward the effective and rational realization of the new framework for international cooperation now under study in the Agency, such as the systems for international plutonium storage and for assuring the supply of nuclear materials and technology, with due account taken of their relation to the international nonproliferation regime.

Point 6 is the international collaboration: the peaceful uses of atomic energy – whether for power genera-

Table III RD&D Schedule of Main Projects

(Example: Construction Operation)



tion or for radiological applications –should benefit all mankind, and in line with this principle, we intend to contribute actively toward international progress of peaceful nuclear applications.

International collaboration is, besides, increasing its importance for projects such as on nuclear fusion and on fast breeder development, which have come to acquire a scale that calls for efforts and expenditures far exceeding what can be supported by one nation alone. International co-operation in research is also indispensable for studies on subjects of common international interest, such as related to the safety aspects of nuclear utilization: we plan to actively promote international collaboration in such research and development efforts, without, however, impairing the integrity of our nationally implemented projects.

As an example of what we are already accomplishing, we have launched in full working scale our programme based on the IAEA Regional Cooperative Agreement for Research, Development and Training Related to Nuclear Science and Technology, by which we are cooperating with the Agency member countries in South and Southeast Asia and the Pacific on the matter of practical utilization of ionizing radiations and radioisotopes. In this programme, we will continue to respond actively to requests from various countries for technical cooperation in such fields

as food preservation, medical treatment and manufacturing industries.

The prominent rises seen of recent years in the price of oil have posed problems of energy supply all over the world. The number of countries is increasing which are considering the introduction of nuclear power in order to ensure a continued supply of energy. Those countries have to begin with training of qualified specialists, construction and operation of research reactors and acquisition of knowledge and experience of ensuring safety of nuclear facilities.

In the domain of nuclear power generation, our cooperation will be premised upon assurance of nuclear non-proliferation, and in so far as countries identify themselves with the Non-proliferation Treaty, we will be able to cooperate positively on such areas as mentioned above.

CONCLUSION

I have presented in brief the highlights of our newly-established Long-Term Programme for Nuclear Development and Utilization. In view of the fact that nuclear energy has already firmly established itself as one of the economical source of electric power, and has acquired a solid footing in our economic system, we plan to maintain with intensified vigour our efforts in promoting the development of nuclear energy to foster its contribution to the further development of our economy and to further enhancement of our living standards. We will be directing more efforts to collaborating with other fellow-countries in our endeavour to contribute to the advancement of the international community.

CSO: 5100/4213

WRITER SAYS AEC 20-YEAR PLAN REMAINS 'PAPERWORK'

Dhaka HOLIDAY in English 23 Apr 83 p 3

[Article by Musleh A. Tarek]

[Text] The 20-year perspective plan of the Bangladesh Atomic Energy Commission (BAEC) has remained "a mere paperwork" mainly due to financial constraints, insiders say.

The perspective plan, taken up in 1980, envisages building up versatile infrastructural facilities for research and development in nuclear science and technology.

It is designed to develop a local base for advancement of technology, a multi-disciplinary research and undertake development work with a view to achieving self-reliance in industrialisation and national development.

The financial outlay of the perspective plan is Tk. 5309 crore including Tk. 429 crore for research and development and Tk. 4880 crore for nuclear power generation.

The first phase of the perspective plan has been included in the Second Five Year Plan (1980-85). The Second Five Year Plan has earmarked Tk. 106 crore for this sector. Till March this year only Tk. 21.42 crore has been disbursed.

The BAEC has four major projects: the Roopur Nuclear Plant, the Atomic Energy Research Establishment at Savar, the Beach and Exploitation Centre at Cox's Bazar and the Exploration of Uranium and Thorium Project.

Of these, no progrer has been made in the Roopput Nuclear Plant.

The Atomic Energy Research Establishment (AERE) at Savar comprises five institutes, namely, the Institute of Nuclear Science ane Technology, the Institute of Food Science and Radiation Biology, the Institute of Electronics, the Institute of Computer Science and the Institute of Nuclear Medicine.

The development work related to the installation, operation and utilization of the reactor to be supplied by the General Atomic Company of the USA in the Institute of Nuclear Science and Technology was scheduled to be completed by June, 1983. But according to available information, the work will not be completed before June, 1984.

The installation of computer in the Institute of Computer Science has not yet been completed. The installation work was scheduled to be completed by December, 1982.

Construction of two nuclear medicine institutes at Dinajpur and Rangpur are progressing at a snail's pace.

Reliable sources say, shortage of funds have forced the AERE to stop halfway the construction of 32 residential units and development of other infrastructural facilities.

The Beach and Exploitation Centre at Cox's Bazar has been facing fund crisis and shortage of trained manpower. The pilot plant was scheduled to be commissioned by June, 1983 but this could not be done till now because of non-availability of funds. The plant is estimated to cost Tk. 45 lakh with a foreign exchange component of Tk. 40 lakh.

The Uranium and Thorium project was taken up in 1976 at an estimated cost of Tk.1.94 crore including a foreign exchange component of Tk.1.1 crore. There is hardly any activity in the project due to financial constraints.

CSO: 5100/7101

DELHI URGED TO WORK FOR SOUTH ASIAN NUCLEAR FREE ZONE

New Delhi PATRIOT in English 22 Apr 83 p 7

[Text] The committee for a sane nuclear policy (COSNUP) on Thursday urged the Government to work for a nuclear free South Asia and halt all nuclear programmes, reports PTI.

The convener of COSNUP, Mr Dhirendra Sharma of the Jawaharlal University, told a symposium in the Capital that "atoms for peace" and "atoms for war" are Siamese twins in that fission technology is not economical for electricity generation without its military spin-off.

Hence, he said, COSNUP calls for a reassessment of India's nuclear policy by an independent body of scientists, economists and public policy experts.

Participants in the symposium included Mr Gobinda Mukhoty of the Peoples Union for Democratic Rights, Dr Ashis Nandy of the Centre for Studies in Developing Societies, Mr Ramlal Parikh of the Gujarat Vidyapith and Dr A Vidyalankar of the National Council of Educational Research and Training.

COSNUP, Mr Sharma said, wanted suspension of the Narora atomic power project, situated 59 km away from Moradabad which had an earthquake in 1956.

The Narora plant, situated on the banks of the Ganga, was not cleared by environmentalists of the Bhabha Atomic Research Centre, he said.

On India's plans for producing 10,000 mw by 2000 AD from nuclear stations, he said it would need 44 units for 230 mw capacity. Each unit would need 60 tonnes of uranium fuel but India's "attainable production capability is limited to a total of 200 tonnes per year according to the International Atomic Energy Agency."

Mr Sharma said opposition to nuclear energy was not "anti-science" but stemmed from concern over technological defects and environmental hazards. Even in western countries, this concern has forced the cancellation or postponement of 90 reactor projects and suspension of 20 others which were under way.

CSO: 5100/7098

ATOMIC ENERGY DEPARTMENT TELLS POWER PROBLEMS

New Delhi PATRIOT in English 25 Apr 83 p 5

[Text] Bombay, April 24 (UNI)--Power crisis and mechanical defects continued to plague the country's heavy water projects last year.

The department of Atomic Energy (DAE) therefore is planning to set up captive power stations at the Tuticorin heavy water plant and the up-coming project at Mangruru in Andhra Pradesh, according to the DAE's annual report for 1982-1983.

There are three heavy water plants in operation in Tuticorin, Nangal and Baroda--which is also rocked by labour unrest--and two under commission in Talche and Kota.

The report says the Nangal plant has been shut down since September end due to a total power cut on the adjoining fertiliser plant imposed by the Bhakra Reas Management Board. Till then, the plant has been functioning quite satisfactorily.

The Tuticorin plant had to be shut down in October to avoid safety hazards after two of the 70 tubes in the high pressure ammonia cracker unit developed leakages. The tubes have since been repaired and the plant is ready for operation, the report says.

The plant has also suffered other major problems necessitating the opening of the exchange towers for cleaning. Dips in voltages and break in synthesis gas production by the Southern Petro-Chemicals Industries Corporation have also adversely affected the plant, it says.

The report says the Baroda plant has been hit by the November cyclone in which its compressor house was flooded. In the last week of January, power failure tripped the entire plant. It resumed production after a few days.

Even the upcoming Talcher plant has suffered due to power crisis and operational defects. The trouble has, however, been overcome and production in the plant was expected to start next month.

The pilot plant in Baroda for studying new methods of making heavy water, is nearing completion and the Bhabha Atomic Research Centre scientists are looking into some other methods.

CSO: 5100/7099

DELHI PROPOSES NUCLEAR ENERGY REGULATORY BOARD

Calcutta THE STATESMAN in English 28 Apr 83 p 1

[Text] NEW DELHI, April 27.—The Government proposed to form an atomic energy regulatory board, Mrs Gandhi said in the Lok Sabha today, report PTI and UNI.

The main function of the proposed board would be to carry out the regulatory and safety functions envisaged for the Central Government under the Atomic Energy Act of 1962, the Prime Minister informed Mr A. Neelalohithadasan Nadar in a written reply.

"The constitution of the board awaits the apointment of a full-time chairman of the board and the latter is presently under consideration of the Atomic Energy Commission," Mrs Gandhi said.

Mrs Gandhi said the present stock of fuel would be sufficient to run the Tarapur atomic power plant at reduced power levels till the introduction of fuel elements fabricated from enriched uranium to be received from France shortly.

The Prime Minister told Mr Amar Roypradhan in a written reply that the agreement concluded recently between India and France envisaged supplies of enriched uranium over a period of 10 years from 1983. The average annual requirement of the Tarapur station is 19.8 tons of enriched uranium.

The Government is examining the report of an Indian technical team which went to the Soviet Union to study a Soviet offer of assistance in setting up a nuclear power plant, Mrs Gandhi said.

The Minister of State for Science and Technology and Atomic Energy, Mr Shivraj Patil, told Mr Balasaheb Vikhe Patil that India had adequate reserves of uranium to meet the requirements of the nuclear power programme currently envisaged.

Mr Patil said the capacity utilization of the Tarapur and Rajasthan atomic power plants declined during the past three years.

He said the Tarapur plant which operated at 48.21% of its capacity in 1980-81 improved its capacity utilization to 53.38% in 1981-82 and then slumped to 30.96% in 1982-83.

The Kalpakkam fast breeder reactor on which Rs 79.12 crores had been spent would undergo system commissioning in early 1984, Mr Patil added.

CSO: 5100/7100

INDIAN DELEGATE SPEAKS AT HAVANA N-ENERGY MEET

New Delhi PATRIOT in English 17 Apr 83 p 3

[Text] HAVANA, April 16 (PI-Pool) —Mr S K Singh India's representative at the second meeting of "the co-ordinators for the peaceful use of nuclear energy", underway here, has said that the meet would seek to reach a common front in the UN conference for the promotion of international co-operation in the use of nuclear energy for peaceful means.

Mr Singh, who is also the Indian ambassador to Austria, commended Cuba's role in strengthening the policies of non-aligned movement and said the holding of the meet here had proved it.

Over 30 delegations from non-aligned countries are attending the meet to discuss the importance of close co-operation in the peaceful use of nuclear energy among third world nations.

Cuban Vice-President Jose R Fernandez who is also the head of the National Atomic Energy Commission said the initiative to hold the conference was based on the recognition of the right of the non-aligned countries to conduct their own nuclear development plan with peaceful aims based on their economic and social needs.

The first meeting for peaceful use of nuclear energy was held in Buenos Aires in 1980, a special committee was set up there comprising India, Algeria, Argentina, Cuba, Indonesia and Yugoslavia to draw up a report on possible areas of co-operation.

The report will be discussed by the participants at the meeting here.

The recent seventh non-aligned summit had also discussed the peaceful use of nuclear energy and had reiterated its utilisation for the economic and social development of the people.

CSO: 5100/7095

PAPER REPORTS, COMMENTS ON NUCLEAR ENERGY DEVELOPMENTS

Indigenous Reactor Water Pump

Madras THE HINDU in English 21 Apr 83 p 1

[Text] New Delhi, April 20.

The U.S. has apparently taken a firm decision not to supply any spare parts for the Tarapur reactors. It also appears it will try to prevent India reprocessing the Tarapur fuel, although it has absolutely no justification for resorting to this action.

It is time that the Government of India turned its attention to the obstructive "scuttle methods" of the U.S. Government in the nuclear energy field, is the view of an authoritative expert source.

As a result of the U.S. Government taking a decision not to supply spare parts, the Atomic Energy Commission has taken the decision to manufacture spare parts, particularly the water pump for the light water reactors.

Indigenous expertise: Indian engineers have developed the requisite expertise in the manufacture of vital spare parts for the various facilities of the atomic energy establishment. They are confident that manufacturing the water pump for Tarapur will not be a daunting task, since they design and manufacture water pumps for heavy water reactors, which is a more complicated and difficult task.

The engineers have gained a wealth of knowledge through attending to the various repairs, required by the heavy water plant at Baroda. The experience gained from the constant shutting down of the heavy water plant and in the power plants (for example, in relation to the refuelling process at Tarapur) has given them sufficient knowledge and mastery to manufacture the needed spare parts. The relevant metals are also available in the country and they would stand any quality test. According to the expert source, the security and safety of the Tarapur nuclear power plant and the personnel operating it have been taken care of in an assured way. It is expected that the indigenous manufacture of the water pump for Tarapur--that has been forced on the agenda by the negative U.S. attitude--will take some 18 months.

Success of Nuclear Policy

Madras THE HINDU in English 21 Apr 83 p 8

[Editorial]

[Text] That India is winning the battle it has waged over more than three decades for real independence in the nuclear energy field is conceded by most international experts qualified to speak on the subject--whatever their specific positions or feelings on this experience. This is also reflected in the 1982-83 annual report of the Department of Atomic Energy, in its performance budget for 1983-84 and in piecemeal official answers to parliamentary questions relating to the power stations, reprocessing and so forth. It is clear that much of the external controversy that has surrounded the Indian nuclear programme has been in the nature of a debate--against and for--over the meaning of independence or self-reliance in a field the first principle of which, in international affairs, happens to be discrimination. The refusal to accede to the global nuclear bargain tied up in the Nuclear Non-Proliferation Treaty and to accept a regime of all-encompassing controls by the International Atomic Energy Agency ("full-scope safeguards") and the serious involvement in virtually the entire nuclear fuel cycle--extending to a Peaceful Nuclear Explosion (PNE) and experimental activity in the fast breeder field--have defined, from an Indian national standpoint, the controversy. And despite the current lean season in nuclear power generation (from which there are signs of a looking-up) and for all the specific weaknesses, lags and cost and time overruns (reflecting industrial and planning deficiencies rather than any fault in the s & t effort), the experience is clearly a success story. The recent vacillations, originating at a political level, in official nuclear policy have not changed the position in any basic sense.

The advantage of strong national support in terms of resource allocation continues. The total Sixth Plan allocation for the actiivties of the Department of Atomic Energy amounts to Rs. 1,051 crores--of which the projected expenditure up to the end of 1983-84 is approximately 70 per cent. For the current financial year, the total resource allocation (Plan plus non-Plan) is a decent Rs. 583 crores, which represents a rise of nearly 26 per cent over the revised estimate for 1982-83. The shares of the nuclear power programme and research and development activity in the total allocation are 76 per cent and 19 per cent respectively, with the balance being taken by the industry and extension programme, supporting services and direction and administration. The programme employs nearly 35,000 people, of whom s & t personnel make up some 60 per cent. While the quality of the scientific work continues to be outstanding and is perhaps unmatched by any other developing nation (in fields such as reprocessing it even appears to be ahead of the work of some developed nuclear powers), the Indian nuclear energy programme is now facing the problem of highly trained personnel leaving it in persistent dribbles. The whole question of remuneration, encouragement and providing an attractive working environment for this vital section of the national s & t force must be examined with a fresh outlook, if the future is to be secured. The role of the Bhabha Atomic Research

Centre (BARC) in building a self-reliant nuclear technology is famous round the world, and significant new research and development facilities have come up, notably in Kalpakkam where a potentially exciting technological experience is under development. Thanks to the far-sightedness of a Homi Bhabha and the solid follow-up efforts of his successors, the power and research and development sides of the nuclear energy effort have been given more or less equal emphasis. The industrial and minerals sector has also built up important strengths, but it is here that a decisive push for improvement could most help the programme which is poised at a sensitive stage. Soon, aside from the advanced achivements of designing, fabricating and building nuclear power and heavy water plants and of conducting a PNE, India will have the opportunity of reprocessing spent fuel on a commercial scale in quite sophisticated facilities, operating experimental fast breeders and taking initial steps in other frontier areas in nuclear science. To build upon and consolidate the great national advantage, it is important for the policy resolve to be stronger and clearer in its sights, for the programmatic side to turn more businesslike and sensitive to issues of public awareness and safety, and for the overall environment to be more encouraging to the scientists and technologists in the field.

Discussion in Parliament

Madras THE HINDU in English 21 Apr 83 p 6

[Text] New Delhi, April 20.

The Prime Minister, Mrs. Indira Gandhi. asserted in the Lok Sabha today that the country was self-sufficient in natural uranium needed for atomic power production and there was no discouragement to scientists in academic research in centrifuge and laser technology.

Replying to a spate of supplementaries from Prof. Ajit Kumar Mehta and Dr. Subramaniam Swamy, she, however, said the research had to be linked with what the country had to do.

"Well, if it is academic research it can go on," she added.

Mrs. Gandhi said the country's resources being limited, it had to think of a plan and what was needed for it. "At this moment we don't need (to produce) enriched uranium."

Dr. Swamy repeatedly asked why the scientists were being discouraged from research in centrifuge and laser technology which even Pakistan had.

Mrs. Gandhi intervened after Dr. Swamy and some others expressed dissatisfaction with the replies given by the Minister for Science and Technology, Mr. Shivraj Patil.

She also intervened when Prof. Mehta asked why India was "begging" for enriched uranium from the U.S.

"There is no question of begging from anybody. We ask for things in a dignified way on the basis of our relations with other countries," she said.

Mr. Patil told Prof. Mehta that only one plant (Tarapur) used enriched uranium and "we get the necessary quantity for it."

With the help of natural uranium and heavy water, India was going in the course it had set for itself in keeping with national dignity and respect, he said.

He said the recent expedition to Antarctica had nothing to do with uranium.

It was because of the encouragement given to scientists that SLV-3 had come up and 80 per cent of the requirements for producing atomic energy were met indigenously, he added.

"If Dr. Swamy is frustrated because scientists are not frustrated I can't help it," said Mr. Patil.

Mr. A. K. Roy asked whether the Rajasthan atomic power station at Kota was producing power at a higher cost because the technology for utilising natural uranium was costly.

Mr. Patil denied that the cost of power generation was high because of natural uranium. There were other factors for it, he added.

Mr. K. K. Tiwari asked whether the Government was aware of the pilferage from uranium mines in the country.

The Minister said the Government had no information about pilferage. However, all steps needed to strengthen security would be taken.

Reprocessing plant for Kalpakkam: Mr. Patil said the plutonium plant in Trombay, decommissioned in 1972, was now ready for recommissioning.

He said the object of the partial decommissioning was to extend the life of the plant and to increase its capacity. The cost of the partial decommissioning was about Rs. 50 lakhs.

A new power reactor fuel reprocessing plant was proposed to be set up at Kalpakkam near Madras, at an estimated cost of Rs. 96.13 crores. Designing of the plant was in process.

Mr. Patil told Dr. Vasant Kumar Pandit that the plant was being set up "entirely by indigenous efforts" and would come up in about eight years.

"No reprocessing plant, including the plutonium plant in Trombay, has been built with any foreign assistance," Mr. Patil said correcting Mr. Pandit's impression that the plutonium plant was Canadian built.

Efforts were being made to develop alternative processes for the production of heavy water in addition to the different technologies adopted in the existing heavy water plants.--PTI & UNI.

CSO: 5100/7097

BRIEFS

FUEL REPROCESSING PLANT--New Delhi, April 20.--Detailed designing of a new power reactor fuel reprocessing plant proposed to be set up at Kalpakkam in Madras is in progress, the Minister of State for Atomic Energy, Mr Shivraj Patil stated in the Lok Sabha today, reports PTI. Mr Patil told Mr Vasant Kumar Pandit that this Rs 96-crore plant was being set up "entirely by indigenous efforts". The plutonium plant at Trombay, which was partially decommissioned in 1972 with the object of extending its life and to increase its capacity, was now ready for recommissioning, he said. [Text] [Calcutta THE STATESMAN in English 21 Apr 83 p 9]

CSO: 5100/7096

IMPACT OF NUCLEAR BOMB DROPPED ON NAIROBI ENVISIONED

Nairobi THE WEEKLY REVIEW in English 29 Apr 83 pp 16-18

[Last part of article entitled: "Nuclear War: Who Cares? What Hope of Survival?"]

[Text] **SUPPOSING** a one-megaton nuclear bomb was dropped near ground-level over Parliament Building in Nairobi. The explosion would release a tremendous amount of energy, half of it in the form of shock waves and blast effect, about 35 per cent in the form of heat and the rest in the form of radiation. Almost all citizens (and all living things) within a two-mile radius of Parliament Building would be killed instantly. Parliament Building, the Hotel Intercontinental, the Holy Family Basilica, the Kenyatta Conference Centre, the Law Courts and all buildings in this central area would disappear into a

In a nuclear attack on Nairobi anyone within this circle would be killed and all buildings destroyed.

[best copy available for repro]

Of the survivors of the blast, almost half would ultimately die of burns from the tremendous heat of the explosion. Even if you were out in the open and away from collapsing buildings, you might be badly injured by being felled by the strong winds generated by the nuclear explosion. Tall buildings such as the Kenya Commercial Bank in the industrial area would collapse because of the shock wave; streets all over this part of the city would be filled with debris; most cars, buses, fire trucks, ambulances and police vans would be destroyed.

Between three and five miles away from Parliament Building, the devastation would still be enormous. Half of the people would die or be injured by the blast and heat of the explosion. Buildings would lose their windows and people would be injured by flying glass. Fires would spread through much of the area and burn for at least a day destroying many of the buildings. Shanty towns like Mathare made of inflammable material would be particularly affected by fires. One of the most terrible things that could happen is a firestorm which could burn out of control at temperatures of thousands of degrees. Such a firestorm would suck up so much air as it burnt that thousands of people would die from lack of oxygen.

Even eight miles away from the explosion — in most Westlands, in the near Eastlands, in Langata and Dagoretti and Karen — the impact of the heat would be tremendous. Most people would be blinded temporarily (flash blindness) for several minutes because of the brilliance of the explosion. Permanent blindness would result from looking at the explosion directly even from as far away as Thika, Kiambu or Kikuyu. Under certain circumstances, city residents as far away as eight miles from the explosion could get skin burns which might ultimately lead to death.

Depending upon the pattern of winds, people much farther away from the explosion would be affected by radiation. This radiation would be spread by thousands and thousands of tons of particles of contaminated soil and other debris floating away from the blast area. Recently, Nairobi has tended to exhibit a pattern of winds which encourages a pall of smog to hang over the city. Were this to happen, with the radioactive debris being trapped between the plains and the beginning of the escarpment, it would mean that most of the residents of the city would be affected by the radioactive fall-out. The final outcome for each individual would differ depending on the intensity, nature of the radiation and how it entered the body.

Approximately 60 per cent of the radioactive products of the explosion fall back to the ground within the first twenty-four hours, creating serious health hazards for the surviving residents of the city. The rest of the radioactive products rise high into the air and are carried to distant areas by winds and take longer to fall back to the ground. The sicknesses which result from exposure to radiation after a nuclear explosion are many. Those exposed to very intense radiation would suffer from coma, convulsions and die within hours. Slightly less intense radiation but measuring more than 1,600 rads (a rad is a measure of the intensity of radiation) would suffer lethargy at first, followed by unsteadiness of movement, convulsions, coma and death within days. Between four hundred and one thousand rads of radiation, there would be about 50 per cent mortality, with the main illness being nausea, vomiting, fever, bloody diarrhoea and bone marrow malfunctioning, which might lead to spontaneous bleeding and susceptibility to infections. Between 150 and 400 rads, the victim might feel generally unwell the first day within nausea and vomiting, followed by a week or two of fever, skin bleeding, mouth ulcers, loss of hair and bone marrow malfunctioning, but with good chances of survival.

Radiation from nuclear explosions leads to many cases of cancer, especially blood cancer or leukemia. Pregnant women have an increased chance of having still-born children and babies born to mothers exposed to radiation late in pregnancy are more likely to die in their first year of life than other babies. The most frightening thing about radiation is that its effect can last for generations. The radiation can alter genes so that children born years after their parents were exposed to radiation might have birth defects which might in turn be passed on to their children.

Nairobi has a population of just under one million people. Since most of

In a direct nuclear blast, the centre of Nairobi would disappear into a hole as deep as Kenyatta International Conference Centre is high.

them do not live in the central part of the city, it is conceivable that the majority of the city's residents would survive the initial blast and heat effects of the explosion. Probably as many as 400,000 people would be left from the explosion. But what would life be like for the "survivors"?

First of all there would be a total breakdown of communications within the city and between the city and the outside world. A nuclear explosion produces what is known as an electro-magnetic pulse (EMP) that travels outwards from the scene of the explosion at the speed of light. This EMP would destroy all telephone and telex communications within the city by creating huge electric currents that would destroy key components of communications systems. Thus there would be no effective way of organising rescue operations or restoring law and order. The explosion would have destroyed the city's water system, power lines, petrol depots and food supplies. Medical facilities in the city would have been reduced to almost nil; any hospital or clinic which still remained intact would most likely have no doctors or medical supplies to deal with the large number of casualties. At the centre of Nairobi, there would be no remains of dead bodies, for the victims would have been vaporised in the explosion, but on the outskirts of the centre, in the Westlands area, Kilimani, Karen, Langata — there would be hundreds of dead bodies with no one to dispose of them. Epidemics would follow from the decomposition of the dead bodies and the general insanitary conditions. There would, in fact, be near total chaos, for Nairobi is not prepared to cope with a calamity of this magnitude. Oddly enough, even cities such as London, New York or Moscow, which are presumably prime targets in the event of an all-out nuclear war, are no better prepared to face the ultimate grim reality of a nuclear attack. Indeed, with their greater population concentrations and more buildings, they would suffer many more casualties than Nairobi and much more destruction. A recent report by the British Medical Association on the prospects of Britain surviving a nuclear attack underscored the problems of organising any medical services in the aftermath of an attack. The breakdown of the transport and communications systems alone, the report said "would prevent any possibility of effective planning on a national or regional scale. Uncertainty about the targets for a nuclear attack, coupled with the massive destruction caused even by small tactical weapons (would mean that) any attempt to lay plans for medical services (and) food supplies for all possible nuclear emergencies becomes a myth."

In fact, any plan for survival in the event of an all-out nuclear exchange between the super-powers is a myth. ■

CSO: 5100/38

RECENT NUCLEAR PLANT REPAIRS, SHUTDOWNS, ENERGY PRODUCTION

Paris NUCLELEC in French 8 Mar 83 pp 10,705-10,707

[Excerpts] Operation of Nuclear Power Plants in January 1983

According to the management of EDF [French Electric Company], the operation of its nuclear power plants was quite satisfactory in January, with an average availability rating of 78 percent (80 percent for the 900-MW PWR [Pressurized Water Reactors] units). Tricastin 4 was put back in service on 4 January after a complete checkout for refueling and scheduled maintenance work. The periodic checkout of Tricastin 1 began on 29 January, and the first complete checkouts for Gravelines 4 and Blayais 1 began on 3 January and 3 February, respectively. We should point out that these two units, which were first connected to the power system in June 1981, have operated since that time with an average availability of 71 percent at Gravelines 4, and 68 percent at Blayais 1.

For systems other than the PWR, we should mention the shutdown of Chinon A2 for repairs from 15 January to 3 February, after the detection of a slight leak of carbon dioxide in an expansion pipe of the primary circuit, and the continuation of the evaluation of the turbine blades at Monts d'Arree, which are severely corroded.

The units whose ownership EDF shares with other parties, Chooz, Tinange, Vandellos, and Phenix, operated satisfactorily.

The net electricity produced in nuclear power plants during the month was:

a.	EDF (alone)	12,715 GWh
b.	EDF (including its association with the CEA [Atomic Energy Commission]-Phenix)	12,877 GWh

c.	EDF (including the French share of Chooz and Phenix)	12,989 GWh
d.	EDF (including the French share of all the power plants it owns in association with other parties (Chooz, Vandellos, Tihange)	13,372 GWh

Noteworthy events during the month of January were:

Unit 1 of Saint-Laurent B was shut down on 10 January because of excessive vibrations in the turbo-alternator unit; after a more rapid slowdown than planned, the line of shafting was jammed, which resulted in damage to some of the bearings. It was decided to replace the alternator rotor and some parts of the dryers-superheaters. It is estimated that this shutdown will last for about 15 weeks.

Unit 2 was halted from 20 to 28 January for temporary repairs of the sealing slabs of the atmospheric cooling tanks, and for some work on the secondary circuit.

The test program at Chinon B1 has been completed, after connection at 50 percent of the reactor's nominal power; tests at a level of 75 percent of nominal power are to begin in a few days.

The first fueling of the Cruas 1 reactor took place from 28 January to 1 February.

The Fessenheim 2 unit has been shut down since 3 January for maintenance and replacement of some of the fuel. At this time, the spindles of the guide tubes of the control rods will be replaced. The reader should recall that at the Fessenheim 1 and Bugey 2 and 4 units, the entire guide tube system was changed. The operation to replace the spindles alone is now possible because of the development of a specialized tool. This operation will also be done at Bugey 3 during its next shutdown, which is scheduled at the beginning of February.

In addition, after checks of the elbows of the primary circuit in units being assembled, it was found that some of them are less thick in some restricted areas. Although the safety of the units in operation can not be affected by this inadequate thickness, an inspection program is now being considered in order to identify the elbows which might present this type of anomaly.

7679
CSO: 5100/2594

DEVELOPMENT OF NUCLEAR ENERGY IN 1980'S

Rome NOTIZIARIO DELL'ENEA in English Feb 83 Supplement ENERGIA NUCLEARE pp 64-69

[Article by G. Bianchi (Enea)-F. Velona (Enel): "Development of Nuclear Energy in Italy in the Eighties"]

[Text]

Scenario of the Italian energy situation and of the nuclear facilities, as foreseen by the National Energy Plan, to cover national requirements in the '80s

THE ECONOMIC AND ENERGY SITUATION IN ITALY

In Italy, during 1981, a slight decline was recorded in both Gnp, 0.2% down from the previous year, and industrial production, which after five years of uninterrupted increase fell by 2.3%, as well as in energy consumption, down by 3.1%.

Despite the satisfactory trend of exports, the balance of payments deficit was around 17.600 billion lire. A determining factor has been the energy deficit which amounted to about 29.000 billion lire, over 23.000 billion of which for oil imports. Compared with 1980 the energy deficit was almost 50% higher, the decrease of 5.6% in imports of oil and oil products having been cancelled by an increase in the price of crude from $ 31 to $ 36 per barrel and, more so, by the large devaluation of the lira vis-à-vis the dollar. Energy account apart, the trade balance for 1981 closed with a surplus of about 11.500 billion lire.

The consumption of energy has declined, from 146.9 Mtoe in 1980 to 142.3 Mtoe in 1981; more specifically, with regard to the various sources:

- consumption of oil has fallen by 5.6% following a decline in demand in almost all user sectors, notably electricity production (-4.2%);
- consumption of natural gas has also decreased (-3.1%), mainly owing to reduced utilization by industry;
- consumption of coal has increased by 5.6% principally because of greater use in electricity production;
- nuclear energy provided about 0.6 Mtoe in 1981, or 0.4% of total energy consumption.

Electricity requirements in 1981 totalled 179 billion kWh, which is 0.7% less than in the previous year; on the other hand the import balance increased to 9.6 billion kWh, 57% up from 1980, since the average import price turned out to be lower than production costs from oil. A total of 41.8 Mtoe were employed in national production of electric energy, 55% of which from oil, 34.3% from geothermal and hydro, 9.3% from so-

lid fuels and 1.4% from nuclear. The penetration of electricity in 1981 was 29.5%, compared with 28.7% in 1980, following the trend towards increased use of electric power that has developed in recent years.

With regard to the correlation between energy consumption and economic growth, there was a further decline in 1981 in the elasticity to Gnp, albeit less marked in the case of electricity than total energy consumption.

At the end of 1981, electric power installed in Italy totalled 49.000 MWe.

THE NATIONAL ENERGY PLAN

In December 1981, when Government and Parliament approved the National Energy Plan, Italy acquired an important instrument of political strategy in the energy sector.

According to the Plan, total energy consumption should reach 185 Mtoe by 1990, with an average annual increase in the decade 1980-1990 of 2.3% and a yearly Gnp growth rate of 3.5%.

Consumption of electric power is set at 68.7 Mtoe in 1990, equivalent to a penetration of 37% and, in particular, the share of oil for electric energy production is to drop to 35% from the present 55%.

The target of containing energy requirements within the level of 185 Mtoe is to be attained by means of a series of measures designed to reduce wastage and to introduce new conservation techniques, without which the forecast for 1990 would be over 200 Mtoe.

It is planned to reduce the share of oil consumption by making the most possible use of alternative sources; specifically, recourse to nuclear energy and to coal are regarded as essential.

The quantitative reference target for the contribution of the different sources to production of electric power in 1980 and 1990, to the attainment of which all the measures taken will be geared, is given below (figures in Mtoe).

On this basis, the contribution of nuclear energy in 1990 would amount to 12% of total demand for electric power and to 4.3% of total energy consumption.

ITALY'S NUCLEAR PROGRAMME

The Power Plants Projected under the National Energy Plan

The estimated production of electricity from nuclear is set at an equivalent of 8 Mtoe in 1990, to be supplied by the existing plants of Latina, Trino Vercellese and Caorso, by the Montalto di Castro plant under construction, and by the first units of a package of 4 power stations of 2000 MWe each.

It has been agreed at national level to use the PWR system for this package of plants as being the best suited to Italy's nuclear programme,

SOURCE	1980	1990
GAS	2.4	2.9
COAL	4.1	22.4
HYDRO-GEO	10.9	11.6
NUCLEAR	0.5	8.0
OIL	23.0	23.8
IMPORTS	1.3	-
TOTAL ELECTRICITY	42.2	68.7
ELECTRICITY/TOTAL (%)	28.8	37.1

as well as in line with the prevailing choice in Europe. The Italian Government has decided that Enel (National Electricity Board) draw up, in collaboration with national industries and Enea (at the time Cnen), a «Reference Standardized Design» for a typical nuclear station consisting of two 1000 MWe PWR units.

Enel will act as General Architect in charge of the overall design of the plants while the Ansaldo company, part of the Iri Group, will be responsible for the design and supply of the «Nuclear System».

Enea is currently engaged in a wide-scale programme of research, development and industrial promotion on thermal reactors with the object of improving safety standards and stimulating the technological skills of Italian industry and its competitiveness in the world market.

The standardized design and the industrial promotion programme are described in detail further on.

As in the past, the siting of the new plants is a key factor in Italy's nuclear programme. The first deadlines set by the National Energy Plan have not yet been met. While the authorities of three of the regions which are to house the new plants – namely Piedmont, Lombardy and Apulia –have already declared their willingness to accomodate nuclear power stations, problems are still being encountered at municipality level. This has prevented so far Enel from conducting – under the supervision of Enea – the technical surveys needed for the selection of the actual sites.

The Chamber of Deputies is currently debating a bill to regulate the procedures for the installation of electric power stations (oil, coal or nuclear fuelled).

The aim of the new legislation would be to promote, starting from the installation of power plants, integrated territorial development actions. In this context, provision is to be made for contributions towards the financing of development programmes in the regions and towns involved.

The financing, which is to be provided by the National Electricity Board, is intended to compensate for the limitations which the installation of the power plants will place on other uses of the areas occupied by the plants and to restore a balance between the legitimate interests of the country and those of the local community.

In addition such financing is intended to favour the development of new economic initiatives in the plant area, thus helping to resolve the problem arising during the transition phase from construction to operation when a large availability of manpower will gradually enter the labour market.

The contribution in question, although applying to electric power stations in general, are to be used to promote alternative sources of energy other than oil. Hence, the financing is to be diversified and will increase according to whether oil, coal or nuclear energy is used.

The Reference Nuclear Plant

As stated earlier, Enel has been entrusted with the task of directing and coordinating all the activities associated with the development of a standardized design, which will be carried out by Enel, jointly with the national industry and Enea.

Enel has already acquired considerable experience with the standardization of conventional 320 and 640 MW oil-fired units, and with that of 640 MW coal-fired units still under way.

It was in 1975 that Enel began studies on the standardization of nuclear power plants. The general plant layout and main systems of the nuclear power stations, equipped either with PWR or BWR reactors, were designed to meet common operation and maintenance requirements, particularly as regards the accessibility, the redundancy and physical separation criteria for safety-related components.

In 1997-78 work on the standardized nuclear plant design was star-

ted in cooperation with an American engineering company (United Engineers and Constructors).

Among the advantages afforded by standardization, the most worthy of mention in the reduction in the plant construction time by:

- simplification of the licensing procedures, which will not be fully repeated for each plant;

rational planning of the manufacturing activities for the main components identical for several plants;

- field organization set forth well in advance for the construction activities at the site, to be adapted to each case with minor modifications.

Besides these positive features, standardization affords general economic benefits; furthermore, the experience acquired during the first unit start-up and tests can be utilized for several subsequent identical stations.

Major emphasis is placed today on personnel training as suggested by the TMI experience; a concentrated effort in this area, as allowed by standardization, would certainly improve the qualification of plant staff and of the operating and emergency procedures.

Standardization will also facilitate research work and studies on safety, making them more detailed, and effective, since all efforts will be concentrated on one project.

However, standardization may conflict with technological development and updating of regulatory requirements.

In preparing a standardized design to be adopted for a certain period of time, say ten years, conservative margins should be adopted to take account of more stringent design criteria which may be required at a later date. Obiously there are limits beyond which the cost associated with such margins are not justified and any modification stemming from not indispensable improvements has to be avoided. In particular, safety criteria will have to be frozen for the package of 8 units, and modifications accepted only if unforeseen events, having substantial impact on safety, will take place.

For the standardized design (of the first set of units) and ad-hoc organization has been jointly set up by Enel and Ansaldo Group. Direction and coordination of the various activities is entrusted to the Enel Construction Division, under supervision of a Steering Committee that includes Enel, Industry and Enea representatives.

Enea's role in the standardized design is to recognize promptly opportunities for promotion and support of national industry. As Safety Authority, Enea will also follow the development of the standardized design and issue interim technical positions as the various phases are completed. Such technical positions will be subject to validation after the completion of a probabilistic safety assessment. This procedure should allow a drastic reduction of the licensing time required for the first and the subsequent units.

The conceptual design for the standardized unit has recently been completed according to the regulatory requirements updated to July 1981 and the relevant report (Conceptual Design/Preliminary Safety Analysis Report – Plant) has been submitted to the Safety Authority according to the original time schedule. Detailed design for individual systems has now started and a number of main component suppliers will gradually be associated with the project activities.

In conceptually similar plants installed in various countries, different design solutions stem from local conditions and specific safety requirements of each country. As regards Italy, potential sites are generally characterized by higher seismicity and in some cases poor bearing capacity of the soil; furthermore special attention is paid to protection against external events (air crash, sabotage, explosions, etc.). The combination of these aspects requires specific plant arrangements, mainly related to the civil structures, the auxiliary systems

and the plant layout that will ensure separation of the various components belonging to the main safety-related systems.

In conclusion, in the present conditions the development of a standardized design requires, besides professional competence and specific experience in the various engineering sectors involved in the design, a balanced compromise between actual and potential requirements, always keeping in mind the main objectives and the time schedule.

Enea's Industrial promotion Programme for Water Reactors

Under the National Energy Plan and subsequent Government decisions regarding its implementation, Enea has been assigned the task of supporting the nuclear national industry with adequate promotional actions.

The aims of the Enea Industrial Promotion Programme for LWRs are twofold: on the one hand, to favour and accelerate the construction of the nuclear power plants envisaged in the National Energy Plan and, on the other land to improve and extend the contribution of national industry to the implementation of the Plan meanwhile enhancing its competitiveness in the international market. A further priority of the Programme is to carry on more exhaustive studies on safety aspects of nuclear plants.

A reform law has been passed by Parliament to adpt the Enea structure to its new task, assigning it the function of liaison between R&D and industrial exploitation. On the same occasion Parliament approved a five-year (1980-1984) financial plan allocating Enea 2.890 billion lire, 550 billion of which for programmes connected with water reactors, including the construction of the Cirene reactor for demonstration purposes.

The programme activities are defined by Enea jointly with Enel and national industry, taking into account that nuclear power plants are a commercially mature product, that the thermo-mechanical industry has to face strong competition and that it stands in need of technological innovations and a reorganization in order not only to satisfy the home market, but also to become competitive abroad.

In the selection of actions to be undertaken, priority is given to the following objectives: improving reliability of power plants, developing national know-how in the field of design and manufacturing capabilities and the establishment and expansion of component testing and qualification centres, encouraging the development of advanced technologies with effects also in sectors other than nuclear.

Specifically, in the case of BWR's, the primary objective of the Industrial Promotion Programme is to ensure the maximum operating availability of the Caorso plant and the early, economical and safe start-up of the Montalto di Castro plant.

For PWR's, priority is given to the standardized design for the 4 × 2000 MWe plants scheduled under the National Energy Plan and to the construction of most of the relative systems and components in Italy.

In this connection actions will be undertaken to rationalize the industrial structure in specific production sectors by means of agreements or industrial mergers.

Support will also be provided to small and medium size industries, in particular in assisting them to acquire adequate Quality Assurance standards and making available experimental equipment for component development and qualification.

Previously, in the period 1975-1981, the Programme gave rise to a series of actions undertaken jointly with engineering and manufacturing companies that produced important results. During that period Enea allocated a total of 110 billion lire to the Programme, 94 billion of which for joint interventions with national industry and 16 billion for its own activities. In addition to these sums industry contributed funds for an average of 25% of the amount

provided by Enea.

In 1981, a total of 270 people from industry were employed in the Programme and 150 from Enea.

With the Industrial Promotion Programme Enea has played an important role as liaison between its research work and industrial activities, which has enabled the former to be directed towards effective and concrete productive requirements. This has been achieved through forms of integrated collaboration in which Enea and industries have jointly defined the objectives and carried out the work.

Owing to this co-operation it has been possible to undertake various activities in support of the construction and start up of the Caorso plant. These and later activities have, moreover, led to a substantial reduction in the use of foreign consulting services for the design of the Montalto di Castro Plant.

Another agreement with General Electric has concerned the development of a fuel containing special additives aimed at reducing pellet-cladding interaction, improve operational procedures and in turn increase the load factor of nuclear power plants: 5 prototype fuel elements have been designed and fabricated, and will be loaded in the Caorso reactor by the end of 1982.

Whit regard to components for the Nuclear Steam Supply System, the Programme has dealt mainly with PWR reactors. Action has been focussed on the main components, such as the steam generators and the primary pumps. An extensive knowledge of thermohydraulic phenomena and related desing criteria for the steam generator has been acquired and a programme for the development of fabrication technologies has been implemented. The major achievements include a new grid model – for which a patent has been taken out – and the development of a fabrication technology in a single piece of the steam generator channel head, forged with extruded nozzles, and of various welding methods. In addition, four experimental large thermohydraulic circuits have been, or are almost, completed: the main one of them is to be used for representative scale tests of the steam generator and is capable of testing a full scale steam separator. A prototype of the primary motor-pump group for the PWR system is currently under construction and will be tested on a loop which gives a full scale reproduction of the reactor primary system. Still in the field of Nuclear Steam Supply System components, a prototype of the PWR control rod drive mechanism has been built and will be tested on an ad-hoc circuit; special machining and welding technologies have been developed, as well as other fabrication methods for the reactor internals.

Safety R&D programmes have been reassessed in the light of the TMI accident: in particular, experiments are being conducted on the dynamic behaviour of the pressurizer and of the steam generator tube bundle; further more the thermohydraulic transient in the core and in the primary loop in the case of malfunctions in the control system are being investigated; finally, studies are being carried out on fracture mechanics and early detection of system faults.

Activities planned for the period 1982-1984 will require investments totalling around 350 billion lire, of which 280 will be provided by Enea and 70 by the industries involved. Enea's financial share of the single projects ranges from 50% to 100%, depending on whether the interest is mainly company-level or national, on the risk attached to the investment, on research costs borne to date, on the expected time for a return of the investments, on the ownership of the know-how and patents, etc. In addition to the existing projects, new ones will be undertaken in other areas, such as heat exchangers (preheaters, condenser etc.), cooling towers, the turbo-alternator group, instrumentation and minor components.

New experimental and testing facilities will be developed and installed both at the Casaccia research

establishment of Enea and at the experimental areas and testing stations already set up jointly by Enea and national industries. In particular, at Casaccia, facilities for component qualification and certification will be built, with special focus on environmental and seismic tests.

Finally, Enea has given a special support to the Super Sara Project aimed at investigating the behaviour of LWR fuel under a variety of accidental conditions, including the most severe ones. This project has been part of a programme financed by the Italian Government (100 Mecu over the period 1973-80) for the exploitation of the Essor reactor at the Ispra research establishment of the European Community. Owing to the interest it has aroused at international level, the Project has now been taken over by the Community which is financing the research programme while the Sara loop is still being built under an Italian Government contract.

Other Activities in the Nuclear Sector

Italy is engaged in a considerable research and development effort in the area of FBRs, where technical cooperation with France is particularly intense.

Enea has a 33% share in Nersa, the owner of Superphénix-1, presently under construction at Creys Malville.

The Nira engineering company, which is part of the Ansaldo Group, shares with Novatome the role of turnkey supplier of the Nsss for Superphénix. Italian manufacturing firms have supplied over one third of the major nuclear components for that plant, also taking advantage of the R&D programme carried out jointly with Enea.

As part of the cooperation with the French Cea, Enea has built a number of experimental facilities, now operational, designed to test the most critical components of FBRs, such as pumps, steam generators, valves and instrumentation. Italy's main contribution within the context of this cooperation consists in the 120 MWt PEC Fast Reactor under construction at the Brasimone site, near Bologna. This facility is designed to test plutonium fuel assemblies ofr FBRs, both in normal and accidental conditions.

A decision whether to proceed to the installation of commercial FBR units in Italy will be taken in the 1990s, once a reliable LWR programme has been implemented and a considerable technological experience on FBRs has been acquired in the country.

The Italian programme related to the Nuclear Fuel Cycle can be summarized as follows.

Enrichment services are assured through the participation of Enea and Agip Nucleare (of the Eni holding group) in Eurodif.

Agip Nucleare and its subsidiaries will provide for the fabrication of the nuclear fuel needed for the commercial LWR Programme.

Enea and Agip Nucleare will undertake a joint effort in the next few years for the fabrication of fuel for FBRs. An international cooperation is being consider in this field to take advantage of the experience and the fabrication capacity already developed in Europe.

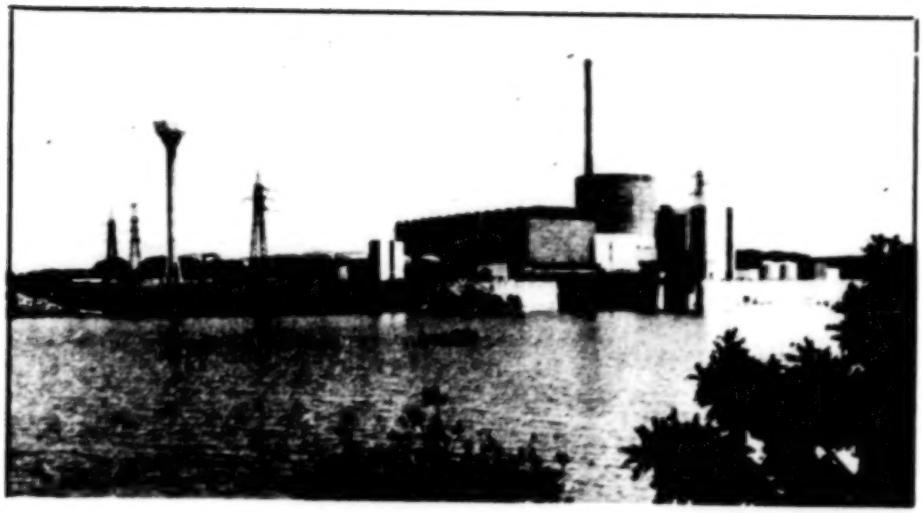
As far as reprocessing is concerned, Enea, in close cooperation with Agip Nucleare, is operating two pilot plants: the Eurex plant at Saluggia, used to investigate reprocessing technologies for LWR fuel and the Itrec plant at Trisaia, originally conceived for experiments on the Th-U fuel, cycle, now being transformed to study reprocessing technologies for FBR fuels. It is too early at this stage to start actions for the design and construction of an industrial reprocessing plant, which will not be needed in Italy at least until 1995.

In the sector of waste management, Enea and Agip Nucleare have set up in May, 1981, the Nucleco Company, which will be responsible for the complete management (including final storage) of low and medium activity waste produced in

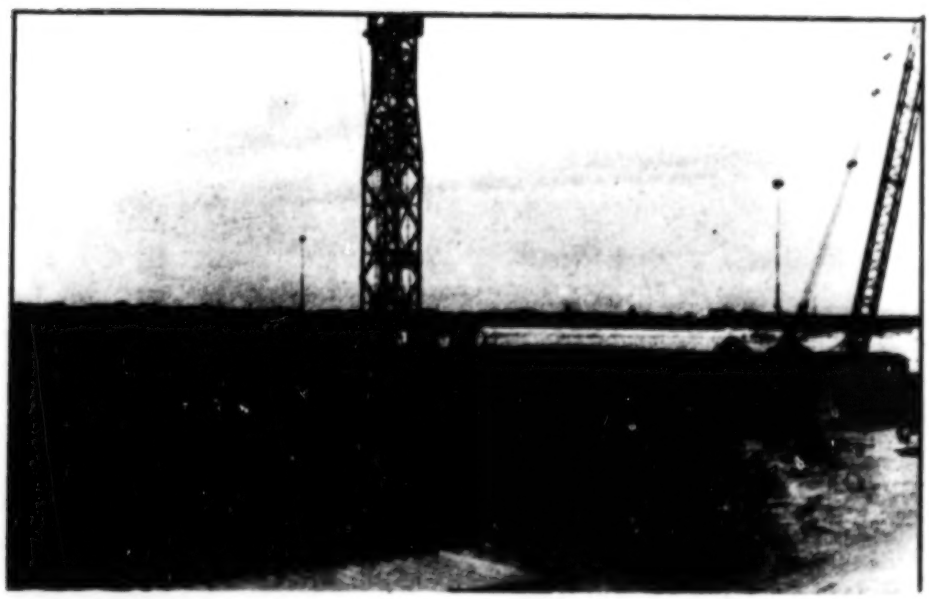
Italy by nuclear plants and laboratories.

As for high activity wastes, Italy operates mainly in the framework of international cooperations, particularly within Europe, with the objective of identifying suitable solutions from both a technical and an economical viewpoint.

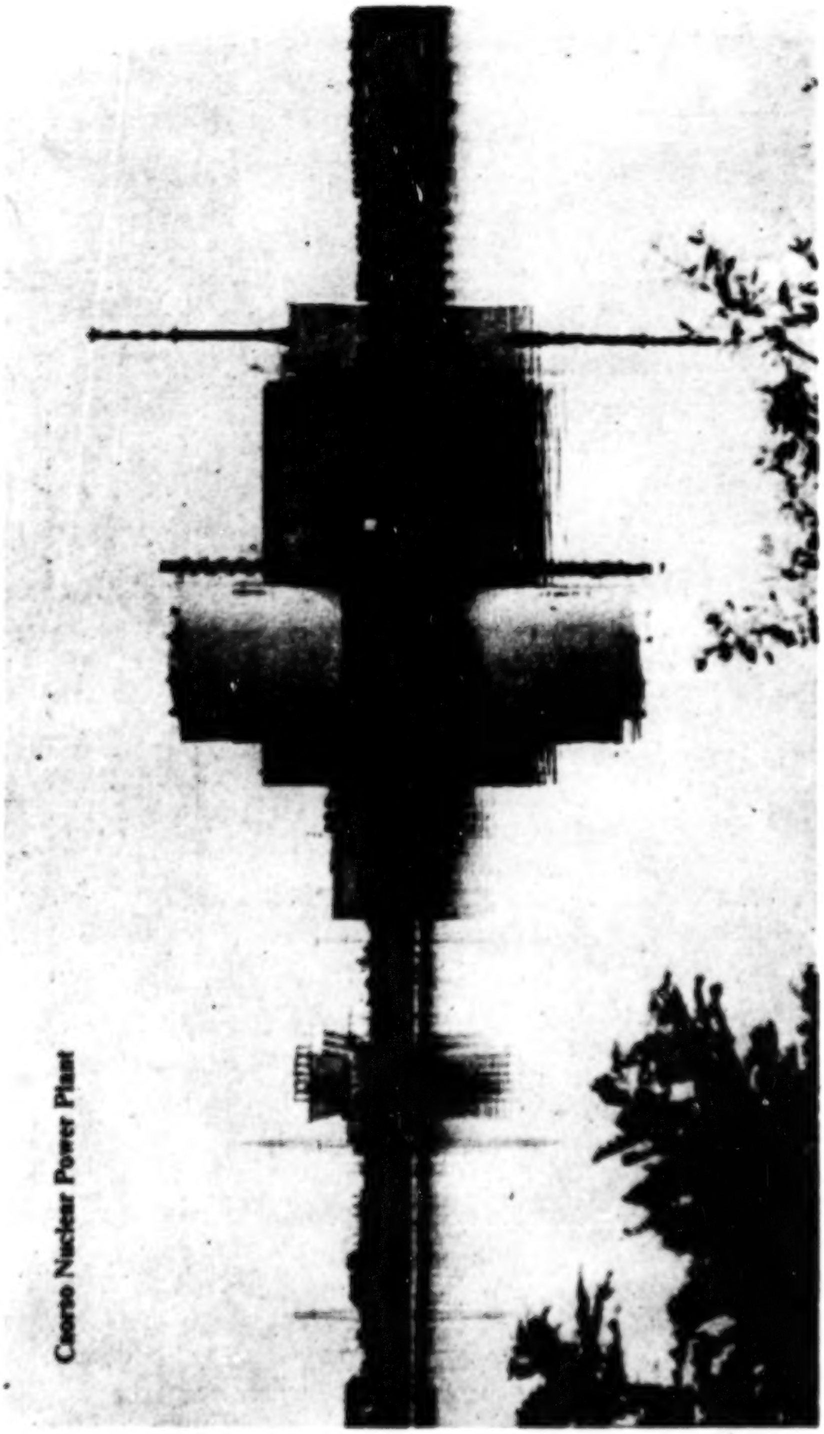
Montalto Nuclear Power Plant Under Construction
(as of September 1982)



Trino Nuclear Power Plant



Montalto Nuclear Power Plant Under Construction
(as of September 1982)



Caorso Nuclear Power Plant

CSO: 5100/2604

BRIEFS

VESSEL FOR PFC REACTOR--Vessel introduced into PEC [expansion unknown] reactor containment structure: Construction of the PEC has reached a particularly significant phase with introduction of the vessel into the reactor containment structure. The vessel, designed by Nira and built by Breda Generazione Vapore of Ansaldo, weighs more than 60 t and has a maximum diameter of 2.5 m; it is 10 m high and is built entirely of stainless steel that meets the most severe standards used in the field of plant-installation construction. The introduction of the vessel into the reactor containment structure, taking place on shcedule and in the manner planned, makes it possible to proceed with the activity relative to the civil-engineering work and to installation of the mechanical components that are arriving at the construction site per the programmed schedule. [Text] [Rome NOTIZIARIO DELL'ENEA (supplement to ENERGIA NUCLEARE) in Italian Feb 83 p 82] 11267

CSO: 5100/2605

END

END OF FICHE

DATE FILMED

June 13, 1983